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The Causes and Means of Prevention of some of the most Important Diseases of the Army: A Discourse delivered before the New York Sanitary Association, November 13, 1862. By JOHN H. GRISCOM, M.D. Published by direction of the Association.

It will be universally admitted that nothing can excel the horrors of the field during and subsequent to a great battle, especially after a series of conflicts in rapid succession, such as were witnessed on the Yorktown Peninsula, in May, June, and July last; and in September, in Maryland. While all deplore the sanguinary struggles, and desire their speedy ending—however opposed one may be to the policy of the Government, or however friendly or inimical to either party in the strife—there probably does not live the man or woman on either side who, when an immediate conflict has ceased, would not, if able, hasten to the scene at the call of humanity, and render every possible aid to relieve the sufferers and save their lives. Never was there a nobler instance of wide-spread benevolence, or a greater regardlessness of money, time, and material, exhibited by a people, than has been developed by the present unhappy war. Almost as one man, the country has poured out its wealth and industry in furnishing supplies for the comfort and care of the wounded and the sick, ever since the memorable day of Sumter, and the end of eighteen months sees the supply apparently as abundant as ever.

The good disposition of the people, and their willingness to bear the burden, have been most nobly demonstrated; but while their spontaneous benevolence finds no diminution, and is systematically and efficiently administered, we fear, when the manner in which the executive departments of the Government have discharged this portion of their functions is inquired into, the verdict will not be so flattering.

After the recent engagements at Antietam Creek, the hospitals, so called, extended over a space *not less than thirty miles in circumference.* Said an eye-witness, "There is not a barn, farm-house, store, church, or school-house between Boonsborough, Sharpsburg, and Smoketown, that is not gorged with the wounded, rebel and Union;" and he adds, "Even the grain-cribs, in many instances the cow-stables, and in one instance the mangers, were filled. *Several thousands lie in the open air upon straw.*"

That such events as these must occur more or less often, and such circumstances continue for a while, and until there is time for the arrival of the needed succor, in the shape of hospital stores, utensils for preparing food and medicines, and all the paraphernalia required for efficient assistance; and that there should be a deficiency of shelter for a while, for so many thousands suddenly added to a sparsely settled district, is a matter of course, and may be unavoidable for a few hours, and even two or three days; but beyond that time, not one wounded or sick man should be exposed to the inclemency of the weather, or without proper surgical assistance, and food and drink. But in the case above related, more than a week had elapsed, and these circumstances were yet to be seen.

Another sad instance of delay and consequent suffering occurred at White House, connected with the establishment of the field hospital at that place, subsequent to the evacuation of Yorktown and the battle at Williamsburg, and during the operations on the Chickahominy. I quote the description of Dr. S. D. Willard, of Albany, a participator in the circumstances, as given by him to the New York State Medical Society, of which he has long been the honored Secretary. "When we arrived, in the evening, (Monday, May 19,) we found a message from Dr. Tripler, requesting us to report to him the next morning, at 7 o'clock. This we did. He informed us that he had determined to organize a field hospital at that place, and to send back the sick and disabled of the army there for treatment. He requested us to establish this hospital, of which Brigade-Surgeon J. H. Baxter was to remain as director. *About three hundred sick had*

been left on the ground. The hospital was to be composed of one hundred tents, erected in double line, on an oblong square, to accommodate twelve hundred patients, or twelve in each tent. There was a delay in obtaining spades and axes; nothing could be done without them. It began to rain early in the afternoon, and the sick men were picked from the road-side as fast as tents were erected to shelter them; others gathered under the trees until tents were ready. Night came, and there was neither straw nor any food. The poor sick and wounded fellows laid down on the ground like brave men, without straw or food, and without a word of complaint. On Tuesday, ambulances arrived with the sick faster than we were able to dispose of them. *The straw we obtained was wet and musty.* There was yet no means of getting water, or beef, or kettles, or wood, and the thousand other things that pertain to the necessities of a hospital,—and when night came again, we all laid down *on the ground* in our tents, tired and hungry, and full of sympathy for the sufferings we could not relieve. On Wednesday, the army supplies began to come in. The Sanitary Commission arrived, and furnished us with beef, straw, beds, pillows, shirts, and towels. * * * *On Thursday, a tremendous rain flooded the ground, and some of the tents, so that many of the sick lay in the water.* This was bad enough, but the men were brave and uncomplaining. Hay *was brought after the rain, to raise them above the wet,* and the surgeons waded through mud nearly to the tops of their boots, to see that the hay was distributed, and to look after the sick. Immediate measures were then taken to *floor the tents with plank, six inches above the ground,* and to increase the drains around them. * * * There were received at this hospital during the first week about seventeen hundred patients. * * * When the wagons and ambulances reached the hospital at night, there was no alternative but to leave the patients in them until morning, until beds could be provided for them."

It seems that even in matters of such pressing urgency as this, Government officials are very slow to profit by experience. Instances of the same kind of deficiency and neglect continue to occur up to this very day. Soon after the second Bull Run, or Manassas, disaster, happening in Washington, while in company with the Surgeon-General, a letter from one of our own army surgeons was handed to him, informing him that 2,000 of our wounded still lay upon the field without any shelter, and a great deficiency of food, and this *was a week after the battle,* and within a *few hours' ride of the capital.* With characteristic energy, his head and heart both stimulated to action,

Surgeon-General Hammond in a few hours had improvised an ambulance corps by impressing every available hack and omnibus in the city, and ere midnight the long train was on its way to the unhappy scene, laden with surgeons, provisions, and medicines, leaving the citizens to wonder what event had so suddenly deprived them of their usual means of vehicular locomotion.

Even so late as the middle of October a newspaper correspondent writes from

"ON THE FRONT, ONE MILE SOUTH OF }
"CHARLESTOWN, Va., Thursday night, Oct. 16, 1862. }

"The army's idleness and the clear, golden days, have gone out together. The troops are advancing, and the Fall storms have commenced. This morning the column moved; to-night 6,000 of our soldiers, without tents or shelter, lie here in the searching, drenching rain."

Can any one doubt that a large number of that noble 6,000 succumbed the next day to rheumatism, pneumonia, diarrhœa, dysentery, fever, or some other of the numerous foes which lurk in the rainstorm, and strike from the mud? Probably not a man of them rose from his earthy bed in fit condition for his duty.

These three examples—the field hospital at White House, with its 1,700 patients lying in the water, though under tents; the post-battle-field of Antietam, with its 7 to 10,000 wounded, covering an area of 30 miles in circumference; and the unsheltered 6,000 at Charlestown, passing a night in the "searching, drenching rain," may be taken as types of the terrific circumstances to which the army of the Republic is sometimes subjected.

I speak of them in this connection not for the purpose of casting censure upon any one, if any be due—nor would I know on whom to place it; that is not my aim, nor should I consider it my duty; but that I may more pointedly and forcibly present to you the *preventives*, within reach of individuals as well as Government, and which the fathers and mothers, the wives and friends of the soldier—in a word, which an intelligent people should see to it are provided for them. For I unhesitatingly declare my conviction, as I believe I shall be able to demonstrate at this hour, that ample facilities are within reach of both Government and individuals, to save nearly every life that ought to be saved from these death-dealing agencies.

There are, then, three positions in which the soldier is apt to find himself, in which he requires *special* means of protection; these are: *on the march*, in *the camp*, and *the field hospital;* and these terms are

intended to embrace all the various circumstances of exposure to the mal-influences of the soil and the weather—every position, in fact, except that of the barracks, which, though possessing their peculiar causes of disease, are not contemplated within the design of the present discussion, except as the remarks may be incidentally applicable.

It is well said by an able sanitarian, Dr. Jarvis, of Massachusetts, that "the power and efficiency of an army consist in the amount of the power and efficiency of its elements—in the health, strength, and energy of its members. No army can be strong, however numerous its soldiers, if they are weak," and especially, we may add, if they are sickened by the neglect of the external circumstances essential to health.

By the investigations of statisticians, it is shown that among the best conducted armies of the world, under the most favorable circumstances, the amount of sickness and mortality has been from three to five times greater than among the same class of persons in civil life; and the inquiries of the U. S. Sanitary Commission show "it is manifest that our Union army is one of the healthiest on record." Nevertheless, it is indisputable that no small proportion of the sickness and mortality which has already occurred is due to causes *positively within reach of preventive measures.*

In order to secure a constantly active force of 300,000 men, the nation must maintain in the field an army of about 325,000. That is to say, out of 325,000 25,000 will be constantly sick and disabled from various causes.

The number of sick varies, in different regiments, from $\frac{1}{3}$ of 1 per cent. to 49 per cent.*

The principal causes of the increased amount of sickness in military over civil life are well known to every medical man who has given the subject attention, and to a brief review of them I now ask your notice, as preliminary to a demonstration of the means of prevention.

One has but to rehearse the particulars of the complete and sudden change of habits of life which almost every soldier undergoes, from the moment he leaves his comfortable home, his well-loaded table of properly-cooked food, his airy chamber, his clean and oft-changed clothing, to none of which has he had occasion to give his personal attention, for it has all been cared for by his mother, wife, sister, or housekeeper, whereas he now becomes suddenly and without experience converted into his own housekeeper, cook, laundress, everything

* Report of Sanitary Commission, No. 40, p. 47.

—one has but to remember and appreciate the totality of the revolution of social condition experienced by the volunteer when he enters the army, to understand how numerous and powerful must be the agencies which press against his health and strength.

Of these evil agencies, unavoidable as many of them are, I do not intend to speak at length, but desire to call attention to some of the most potent and productive. It is true that a proper amount and kind of food, a sufficient amount of sleep, cleanliness of skin and purity of air, are essential to the preservation of that degree of robustness of body and tone of mind which constitute an able-bodied man, and in proportion to the absence of these are the individuals of the army rendered inefficient; but if asked to mention the circumstances or practices which, before all others, are the most active and general in the prostration of the strength and health of the men, I would instance two in particular, viz., *sleeping on the ground*, and the *crowded occupation of close, small, and unventilated tents.* These causes of sickness may exist anywhere, in any region of country, but when to these are superadded the paludal miasms of the South, we find diseases of most grave character and great abundance.

Every army that has yet existed has proved the noxiousness of these practices in a greater or less degree. In the British Army, in 1798, says Dr. Pringle, the regiment which had 52 per cent. sick in two months, and 94 per cent. sick in one season, "were cantoned on marshes whence noxious exhalations emanated." "Another regiment encamped where meadows had been flowed all winter, and just drained, and half the men became sick." Says Dr. Ed. Jarvis, in his excellent paper on the *Sanitary Condition of the Army*, in the *Atlantic Monthly* for October, "One of our regiments encamped at Worcester, Mass., on the Agricultural Society's grounds, where the upper soil was not dry, and the subsoil was wet. The men slept in tents, *on the ground;* consequently there were thirty to forty cases of disordered bowels a day. The surgeons caused the tents to be floored, and the disease was mitigated.

The 11th Mass. Regiment was encamped on a wet soil at Budd's Ferry, Md. In a week thirty cases of fever appeared. Dr. Russell, the surgeon, ordered the camp to be removed to a dry field, and the tents to be floored with brush; no new cases of fever appeared afterwards.

But instances of this kind are innumerable; it may even be said that the contrary practice is the exception, for, *with the present style and character of tents*, even when this movable canvas house is attain-

able at all, as well when it is not, the ground for a bed, be it wet or dry, is often inevitable; and this, I repeat, is one of the most potent and abundant causes of the extraordinary amount of sickness observed in army life.

With the ordinary substitutes of straw, or boughs of cedar or fir, or even wooden floors, these evils are but slightly modified, as is demonstrated in the official report to the Secretary of War, by the Sanitary Commission, on the sanitary condition of the Volunteer Army, made in December, 1861.

The following data, taken from the returns of 120 regiments, chiefly in November, show the ratio of sick men per thousand in regiments which had been supplied respectively with india-rubber blankets, wooden tent floors, straw, fir or cedar boughs, and the bare ground for sleeping on:

Regiments Sleeping on	120 Regiments—Average Ratio per 1,000 Sick.
India-rubber blankets	60.9
Wooden floors	75.7
Straw or boughs	77.5
Bare ground	91.3

Even board floors, the next best to india-rubber blankets, were generally objected to by experienced officers, as they were thought to be more damp than the ground itself, (though we are not told how that could happen,) and as they offer an opportunity for the collection of rubbish and dirt, and make them difficult of removal.

The second circumstance upon which the chief causation of military diseases must be laid, is the excessively foul air inhaled by every man during his sleeping hours, when these are passed within the narrow and crowded confines of an ordinary tent. Except the Black Hole of Calcutta, where the mortality in a single night was 123 out of 146; or the former convict transport-ships of Great Britain, where it ranged from 60 to 70 per cent.; or the abominally kept tobacco warehouse and other prisons of the rebel capital, there is scarcely to be found a more unenviable or dangerous dormitory than the tents in ordinary use at present in the armies of our own and other nations.

To illustrate the wide difference between what is considered essential to good health in the dormitory arrangements of domestic life, and

their compulsory counterpart in military life, let us view them side by side.

A decent chamber in an ordinary dwelling of the moderate size of 15 feet square and 10 feet high, giving 2,250 cubic feet of air, with two or three windows, a door and a chimney, whereby connection with the open air is constantly maintained, is commonly regarded as a small enough sleeping-room for two persons. It gives 1,125 cubic feet to each. Three lodgers in such a room are regarded as too great a crowd for health; and when necessity compels a larger occupancy, as of five to ten persons, (as in hundreds of tenement houses in this and other cities,) even when ordinary ventilation is maintained, which is scarcely possible under such circumstances, there cannot be a sufficient supply of oxygen for the full decarbonization of the blood, and the occupants necessarily rise in the morning languid, enfeebled, and unrefreshed; if, indeed, they are without headache or fever, or some other positive evidence of disease. Even with the smallest number of occupants I have mentioned, the olfactories of one entering the chamber in the morning, from the fresh air, will furnish unmistakable evidence of the kind of occupation it has had during the night.

Now, the Sibley tent, the most favored of the numerous forms in use in our army, has a cubic area of only 1,052 feet—less than one-half the chamber I have supposed—yet it is required to accommodate from 12 to 20 men. 12 men have in it an average of 88 cubic feet, while 20 have but about 52 feet each. But there are some tents in use which give less cubic area than this—one even so small an amount as 25 feet to each man. Will it surprise any one to learn, that with such shocking sanitary circumstances as these; such total disregard of all natural hygienic law, that the sickness in military life should exceed three to five times the amount in civil life, even under the worst conditions of the latter?

The English bell-tent, said by Quartermaster-General Airey (a singularly inconsistent name, if he is responsible for the fact,) to be the best in use, contains 512 cubic feet, and lodges 12 to 15 men when on march, and 8 to 12 men when in camp; in the former case affording 34 feet, and in the other 43 feet of breathing space for each. Now, it is a fact that every living man inhales an average of at least two hogsheads of air every hour; consequently, 12 men will consume, in 6 hours, 144 hogsheads. But the capacity of the best tent is probably not more than one-eighth of this; and the result must be, that at the end of 6 hours' occupation of a tent, if there has been no

ventilation, the air within must have been inhaled eight times over, with a result to its character which language cannot describe.

Another mode of computation gives the same general result. The amount of fresh air required per minute by each individual is differently estimated by different physiologists, varying from 2½ cubic feet to 20, according to the varied circumstances under which their experiments are made. Taking the moderate medium of five feet as a basis, let us see what opportunities are offered for that amount in a tent. The *Sibley tent* contains, as already stated, when empty of everything else, 1,052 cubic feet. When a man enters it, an equal bulk of air goes out of it; in other words, its aerial capacity is reduced by so much, and 12 men reduce the bulk of air proportionately. Allowing 6 cubic feet to each man, 72 feet of air are therefore expelled, reducing the breathing area of the tent to 980 cubic feet, or about 82 for each man. But we have seen that at least 60 cubic feet of air per minute are needed for the healthful respiration of 12 men; consequently, all the air inside the tent, if it is shut close, will be inhaled in less than a minute and a half; and in one hour, should the inmates live so long, they will have reinhaled the air 40 times. The mortality in the Black Hole of Calcutta is, therefore, easily accounted for and understood; and were our tents made of impervious stone walls, even with a window, or the peak opening, similar results would be observed. Fortunately the canvas walls are not impervious to air, and the lives of the men are not immediately destroyed, though their health does suffer, as our crowded hospitals all over the country prove.

But respiration is not the only means by which the living body vitiates the air in which it lives. The carbonic acid gas, formed by the union of the oxygen of the air with the carbon of the blood, and which is thrown out at every expiration, it is true is the most directly poisonous product of animal life; and it is also true, that "the insalubrity of the air *is in the ratio of the carbonic acid diffused through it.*"

The direct deleterious influence of this poison, however, is assisted indirectly by the diminution of the quantity of oxygen. The removal of the carbon of the blood by means of the oxygen of the air is essential to the purity of the vital fluid, and in proportion to its undue retention are evil results observed. Therefore, when from four to six per cent. of the oxygen is *lost* at each respiration, a second inspiration of the same portion of air not only carries into the lungs the carbonic acid before exhaled, but the absence of a sufficient proportion of oxygen prevents the removal of another portion of carbon, which, being retained in the

blood, destroys, by so much, its vitalizing property. Non-ventilation, therefore, produces, in this way, a doubly deleterious effect.

But neither is this all. Besides these results of *respiration*, other sources of contamination of the atmosphere exist in *pulmonary* and cutaneous *transpiration*. A large amount of *watery vapor* is continually exhaled from the surface of both the lungs and the skin. The enormous amount of this substance thrown into the air from these organs is easily ascertained, but would scarcely be credited without evidence. The entire surface of the pulmonary air-cells and tubes is estimated by Lieberkuhn at 1,400 square feet, (equal to a floor 28 x 50 feet,) from which aqueous vapor is continually exuding in variable quantities, according to the state of the atmosphere, and other circumstances. It varies from half a pint to nearly a quart in twenty-four hours. It is this which we see in the form of a light cloud, issuing from the mouth in a cold day, with every exhalation, or condensing in drops when breathed upon a cold window-pane.

Besides this, every man's skin is an active distiller of fluid, in the form of *sensible* and *insensible perspiration*. The perspiratory tubes of the adult body, if placed in single line, would extend to the length of 28 miles; and they terminate on the surface of the skin in *seven millions* of pores. Through this immense line of sewerage there is poured out into the air around each person, every 24 hours, an amount equal to that from the lungs, as just mentioned. The estimated minimum total of both is 4 pounds, 6 ounces. This cutaneous "perspiration and pulmonary transpiration are not water only, though composed largely of that element. A small portion of it consists of free acetous acid, muriate of ammonia, soda and potash, an atom of phosphate of lime and oxide of iron, and a minute quantity of animal matter, closely resembling gelatine. The relative proportion of solid matter to that of water varies from 0.5 to 1.25 per cent.; and a portion of carbonic acid gas is also exuded with the perspiration."

It must be borne in mind that the whole of this 4½ pounds of matter, daily thrown off from the living body, is effete, unvitalized, liable to, and actually does undergo decomposition in a close atmosphere, aided by the heat of the body itself; and both in its natural state, but especially in its condition of putrescence, when concentrated and pent up, it becomes a virulent poison, whose effects are seen in the typhus and other diseases, the *opprobria* of jails, emigrant ships, hospitals, barracks, camps, and other crowded, filthy, and unventilated places.

A regiment of 1,000 men throw off from their persons, every 24

hours, 4,500 pounds—more than two tons—of this deleterious matter. In the open air, especially under that wise and benevolent provision of Nature, a good breeze, it is removed immediately from the precincts of the body, and its inspiration is prevented; but when concentrated in a close room or tent, its reinhalation is inevitable more or less, and a more or less depraved state of the blood and body is the equally inevitable result.

The proportionate amount of air to each occupant of a tent, or building of any kind, is, after all, a matter of consequence only in connection with the *absence* or *presence of ventilation*. A small area, with *good* and *sufficient* ventilation, is more wholesome than a large area without any. If the foul and poisonous products of respiration, the carbonic acid, the moisture, and the other animal exhalations, could be removed as fast as produced, and their places supplied with pure air, an individual might, as far as mere breathing is concerned, live as well in a hogshead as in the open air with only the canopy of heaven for a covering. But a renewal of the air, constant and sufficient, he *must have*, or sickness in some one of its numerous forms will ensue; or at the best he is called to his daily duties unrefreshed, and unfitted to bear their burden.

But the question will be asked, Are not these tents ventilated? Is no means provided for the escape of the foul gases, and the admission of fresh air? And if not, why not? The popular Sibley tent is claimed to be well ventilated; sufficiently so for the largest crowd that ever occupies it. But the entire fallacy of this claim is demonstrable upon well-established principles of pneumatics. The form of the Sibley tent is a circular cone, closed all round, with a slit in one side, which may be enlarged by drawing aside the canvas, so as to form an entrance. The apex of the cone is formed of a separate piece, and is so arranged that one-half of it may be always open, and it revolves so that the open half may be made to present against or from the wind at pleasure. When presented from the wind, or when there is no wind at all, it is supposed that the foul air within will escape by this aperture. But it scarcely needs an argument to prove that when the tent is closed below, which will always be the case in cold or rainy weather, (for the sleepers adjoining the entrance will see to that,) and no air can there find access, it is next to impossible for the air within to escape by the opening above, or for the external air to enter thereat, except by the very slow process of chemical gaseous diffusion; and were this a sufficient means of ventilation, the Black Hole of Calcutta had been unheard of. In fact, this arrangement of

the Sibley tent is precisely that of a bottle with half a cork in its mouth. If we can imagine such an aperture, or even the whole aperture of the bottle, to act as a ventilator, then we may imagine it also of the tent; but it is manifestly impossible. There can be no interchange between the atmosphere within and that outside, except by the chemical process just mentioned, which would be too slow for the requirements of a single individual, much less sufficient for a dozen or a score.

In a letter to the Governor of Massachusetts, on the sanitary condition of the troops in the neighborhood of Boston, Dr. S. G. Howe employs the following emphatic language, confirmatory of this truth:

"As for the floor space and the cubic space of air allowed to the men inside the tents, it seems hopeless, with the modern ideas of encampment, to have as much as is absolutely required for health. Of all the *impedimenta* of an army, tents are among the greatest; and many brilliant campaigns have been made without them. Indeed, I doubt whether, in the long run, men who sleep in the open air, without other covering than a hooded capote or a poncho, suffer more than those who are poisoned by the close and fœtid air of tents. In ours, the floor surface is so small that the men must lie in contact; while the roof is so low that the cubic space is no greater than that of the Black Hole of Calcutta.

"It is true that in dry weather the canvas is porous; and besides, the flaps can be kept open; but in wet weather the canvas becomes almost air-tight, and the doors must be kept closed.

"As for the self-ventilating tents, so called, they afford relief to some extent, and in ordinary weather; but, like all other modes of ventilation which depend on atmospheric pressure, *they fail in those conditions of the atmosphere when ventilation is most needed.*

"Think of putting 12 men to lodge in a room 12 feet square by 6 feet high, though ever so well ventilated. We would not so treat our children; we would be ashamed so to treat our servants; but we do so treat our soldiers."

[The reading of the paper was here suspended, for the exhibition of a working model of McKinnell's *Concentric Double-Current Ventilator*, by Mr. John Hyslop, demonstrating the impossibility of ventilation by a single opening in the ceiling or roof of a house alone.]

The next consideration due to this subject is of the *measures of prevention*, and these must vary with the different circumstances in which we find the soldier.

His position *on the march* is, in many respects, widely different from

that *in camp;* while they are still different, both as to his personal condition and self-ability, while *in hospital*, especially when wounded, and particularly immediately after the battle, before he can reach a regularly organized hospital. Under the latter circumstance he is a perfectly helpless being, appealing in language which, though mute, is in the strongest possible terms, to every feeling of human brotherhood, every sentiment of patriotism, and the positive inculcations of Christianity.

Allusion has already been made to the first great necessity—an ample and well-trained *ambulance corps*—consisting of suitable carriages, furnished with couches, hospital stores of every kind, (including casks of water that will not leak their contents all away before reaching the field, as was the case as Centreville,)* and every appliance that can be desired for the succor of the wounded. Of the precise style and form of ambulance carriage it becomes not me to speak on this occasion, further than to say that the Governments of Europe have furnished us abundantly with opportunities to determine that point, and the results of their experience are actually on record in our own national archives, obtained by the military commission appointed by Jefferson Davis in 1855, of which Captain (now General) G. B. McClellan was a member. After the bloody battle of Inkerman, according to the report of that commission, the form of carriage most in vogue was a wrought-iron chair or litter, hung in pairs like *pack-saddles* on mules' backs, and one hundred and sixteen of which, in use on that occasion, sufficed to transport all the wounded in a very short time. That our Government has not entirely lost sight of this suggestion I know, from having seen a few of this ingenious arrangement strapped upon horses, ready for immediate use, but why they have not been more freely brought into requisition, I know not and cannot opine. These of course should not be preferred to wheeled vehicles, when the latter may be made serviceable.

This subject being now undergoing discussion pretty freely in the press, it is hoped that we may not again be put to the open shame of a repetition of the shocking delays and neglects which have been seen after almost every severe battle of this war; and if our Government, for any reason whatever, still further postpones the necessary measures of relief, let the matter be taken in hand by the people themselves, either directly, or through the U. S. Sanitary Commission, which has already done so much for the relief of our sick and wounded,

* Dr. Bowditch's letter.

and within whose immediate purview it comes, and whom the country would undoubtedly in such an undertaking second with all its might, with both money and material.

Though declining to occupy the present time with any suggestions as to the best or proper form of an ambulance conveyance, I cannot refrain from throwing out one hint, because of its very obvious necessity, though I have not seen it alluded to elsewhere. I have already quoted some instances of the long exposure of the wounded to the inclemency of the weather, from the absence of shelter of any kind. It may happen that every future battle, like many of the past, may be fought at so great a distance from any general hospital as to render the transportation of the wounded thither impossible within a reasonable time; and, as at Centreville and Antietam, there may not be even enough *cow-stables* or *mangers* in which to find shelter from the piercing winds and rain. Now it appears to me that this might readily be obviated, by requiring every army wagon or ambulance wagon, or if this be impracticable, that there should be vehicles especially adapted to the purpose, of carrying *hospital tents*, to accompany the different army corps, ready for every emergency of the kind. Such a tent as is before you to-night, better ventilated than any ever before made, and so arranged in the interior that the inmates *cannot lie on the ground*—though it would be valuable in common use in camp as a preventive of sickness, would be especially so as a hospital tent, under the emergencies of the battle field.

Had each army or hospital wagon been furnished with one of these tents at the recent field of Antietam, each tent accommodating twelve men, every wounded soldier would, in a few hours, have been placed on a comfortable, dry hammock, under protection from the sun, wind and rain—avoiding the wet earth as a bed—and rendering even straw or hay unnecessary. To that sad scene of suffering, scarcely equaled in extent of area or of numbers in modern times, the Sanitary Commission sent out a large number of wagons with supplies of every kind, *except this one.* What a boon would have been one to each wagon!

The tent before you is called the *ventilated hammock tent*, and is the result, as I am informed, of long study after extensive inquiry among the improvements and practices of other nations, by an officer of the American army, Gen'l Geo. W. Morgan, of Ohio, formerly our representative at the Portuguese Court. As its title indicates, it possesses two important qualities: 1st, The arrangement of hammocks, twelve in number, by which that number of men have each a separate sleeping berth, on which they can comfortably repose, not only above

the ground, but with a space of air between them and the soil, whereby the influence of its cold or dampness is completely avoided. Each hammock weighs only two and a half pounds, and by its use all other adventitious contrivances for a bed, as straw, boards, brush, and even India-rubber blankets and cots, are rendered unnecessary. One great advantage of this arrangement is, that in a few minutes after *reveille* call, every hammock can be unhung, rolled up in a small ball, and put away, leaving the interior of the tent a clear space, where tables may be spread, a fire kindled, a pot hung, or anything else requiring room, be done; and at *tattoo*, in an equally short time, the hammocks may be again stretched for the night's repose; all of which comforts and conveniences are denied in any ordinary tent where the floor is covered with straw, or boards, or brush.

Its second advantage is one which I suppose may be adapted to other forms of tent, but which, as it has been first adopted in connection with the hammock arrangement, deserves especial mention in that connection; I mean its *better ventilation*. Unlike the Sibley, this tent has openings near the peak or ridge, on *both sides*, whereby, in whatever direction of the wind, the external air will enter on one side, and the foul air within escape by the other; and even in case of a calm, the quadruple apertures will allow a thorough interchange of the atmospheres, which is impossible with a single one, as you have seen in Mr. Hyslop's model.

By this arrangement of apertures, each being covered with a fly to exclude rain, the tent may be closed below, and yet there will be a ready removal of the impure, and a supply and distribution of pure air; not always with such rapidity, perhaps, as to prevent absolutely *any* retention of the exhalations for a little while, but to avoid it in such degree as to render tent-life comparatively harmless.

Another valuable point of this arrangement is yet to be noticed. In all ordinary tents, every aperture below, in cold or wet weather, is pretty sure to be closed as tightly as possible by the sleepers on the ground, to prevent the unpleasantness and danger of a direct current of cold air; and for more effectual security, an additional strip of canvas, called the *sod-cloth*, is frequently attached to the lower edge of the tent inside, resting on the ground, which is kept in place by laying on it the straw or other material used for the beds, thus almost hermetically sealing the tent below. But in the new arrangement, the lower tier of hammocks being twenty-one inches above the ground, the lower edge of the tent may be raised a few inches, and the inflowing current of air will be so diffused before it reaches the sleepers, as

not to be felt through the hammocks on which they rest, and all may have the advantage of it.

It is an interesting fact, that in a Report on Army Medical Statistics, presented to the British House of Commons, (printed in June, 1861,) after the experience furnished by the campaigns of the Crimea, it is stated that, "If soldiers die in battle by hundreds, they die in hospitals by thousands;" and we find mentioned as necessary to reduce the sickness in the field, the application of the following two among other principles, viz.: 1st, "*Letting the men, when it is practicable, breathe purer air;*" and 2d, "*By raising the men, in their tents, from the ground.*" The value of these obligations is here recognized by high authority, yet the only method hitherto adopted to accomplish this latter purpose is that of movable cots, which, from their cumbrousness, can only be used in permanent locations, as field-hospitals; whereas, the light weight of the hammock enables it to be carried in a knapsack or a pocket. It was left for American ingenuity to devise a plan for both purposes.

But it is true, as stated by Dr. Howe in his letter to Gov. Andrew, that tents are among the greatest *impedimenta* of an army. Except in winter quarters, while in camp, or other circumstances requiring a long detention of the army in one vicinity, tents become a burden. In long and rapid marches, in frequent changes of position, especially in front of the enemy, they are very apt to be left behind, and under such circumstances some substitute is essential to protect the men at night from the storms, and even from the dews. For this purpose the "*tent d'abri,*" or *shelter-tent*, was invented, and some of our own regiments have discarded the large tent altogether, and trust entirely to the small shelter-tent. This accommodates but two men, who must necessarily lie on the ground, except they have rubber blankets, or boughs, or straw; they are generally made of light cloth or canvas, which is not entirely impervious to rain, as I have been informed by a member of the 51st, who has slept under one. They afford, of course, very narrow quarters; but so far as the cubic area is concerned, could they be sufficiently ventilated, they would be as appropriate as the overcrowded ordinary tent.

It has been left, in this case, as in the other, for American ingenuity to contrive an arrangement of the shelter-tent, which is a great improvement on the French; on the original of which there seems to have been no previous attempt at improvement.

I am happy to have the opportunity to present this new and ingenious arrangement to the Association this evening, as one of the

means by which the health of the soldier may be preserved. This tent is made of material impervious to water; is in two separate pieces or sides, each of which is carried by one man, and serves him, when not needed as a tent, as an excellent water-proof overcoat, when on picket or guard duty, or when otherwise exposed; or as a blanket, in which he may securely ensconce himself; and at night, when united with a corresponding sheet or side, forms a tent which completely protects from the weather. A very neat point of this arrangement is, that without intending it, the maker has so made it that it is self-ventilating, on the same principle as the hammock-tent, by the apertures, by which it is slipped over the head when worn as an overcoat.

Mr. President, when my attention was first drawn to these important subjects, some months ago, during visits to the vicinity of the seat of war, it seemed to me remarkable that so imperfect provision existed in advance for the care of the sick and wounded of the army. As subsequently I saw and heard more and more of the losses and sufferings consequent upon a want of means of transportation, and of temporary or field-hospital accommodation, the wonder increased that a government so powerful and rich in resources, sustained by a people whose sympathetic heart pulsates in unison with every benevolent thought, should so neglect this branch of the military service. But the climax of surprise was reached when I heard from the lips of the head of the medical department himself, that he had pressed this serious matter again and again upon the appropriate departments, and had gone as far as official propriety would permit in urging its consideration, and that action on his suggestion had positively been declined by his official superiors, leaving him powerless in his benevolent wish.

Under these circumstances, my attention was called to the particular measures which have been described here this evening, and which are emphatically measures of humanity—true *life-preservers*. A careful and independent examination convinced me of their inestimable value, and I took occasion to solicit for one of them, the hammock-tent, the consideration of the distinguished head of the Government himself; but the vast general concerns of the Republic forbid his close attention to matters of detail, which belong more especially to subordinate departments. I was told, moreover, by a distinguished and influential citizen, that he had exhausted argument with the head of the Bureau to whom action on the subject belongs, in reference to the superior qualities of the hammock principle, but found him immovable. He firmly rejected it.

Under these circumstances, most solemnly impressed with the verity of the views I have expressed, I have felt it a duty to bring these topics before my fellow-citizens for their consideration; peradventure, some plan might be suggested by which these preventive measures could be made more generally available; and I tender to you, Mr. President, and my fellow-members of the Sanitary Association, my cordial thanks for this opportunity to do so, and to the several gentlemen who have rendered me their valuable assistance in illustrating, so fully, my purpose of showing by what means many lives and much treasure may be saved, this sad war be facilitated to its conclusion, and our beloved country be more speedily restored to her peaceful and prosperous condition, and, as I fondly hope, with a Union forever free from every disturbing cause.

An Improved Mode of Treating Fracture of the Thigh (and other Accidents of the Lower Limbs) without Extension, Splints or Bandages, by which the Patient can be safely transported to any Distance without Interruption of the Cure, which takes place without Shortening or Eversion of the Foot, and in perfect Symmetry with the Sound Limb. By R. NELSON, M.D.

It is admitted as a rule, that shortening always takes place in the cure of fracture of the femur, unless it be a transverse one, which so rarely happens that it needs no notice in this paper. Besides shortening, more or less deformity—as turning out of the foot, and sometimes stiffening of the knee-joint, follow. To guard against, or remedy these serious results, numerous devices, from the earliest times until now, have been employed, with only partial success. Short splints, long splints, the double-inclined plane, various modes of extension, even that of a weight acting ceaselessly, have been had recourse to in vain. The object of these appliances is to maintain the limb of its natural length, and to keep the fractured ends in apposition, in both of which cases they more or less fail; for the short splints can only compress the muscles against the bone at the lower two-thirds of its length, since the bandages or ligatures that confine these splints can reach no higher than the inside of the groin, which is only a little higher than the first third of bone; especially in robust men—in the pyriform thigh of women—and in the enormously fat thigh of children. Besides these defects, the short splints exert no control against shortening. They are in this respect useless.

The long splint was invented to remedy one difficulty—muscular con-

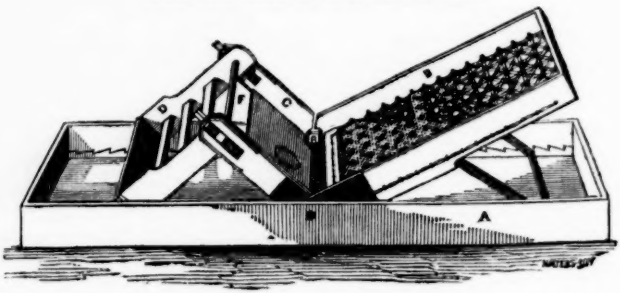
traction, and the consequent shortening of the limb. This is effected by counter-extending forces hitched to the extremities of the splint. That at the groin losing nearly half of its power by reason of the obliquity of its position and action, more across the thigh than in its long direction, and by the constant yielding of the soft parts under the strap. Besides these faults, the groin strap produces much pain, chafing, sometimes even ulceration, and always irritation—which irritation ceaselessly excites the muscles to that very contraction it is wished to overcome. It exerts no controlling power over the action of the iliacus and psoas muscles, which ceaselessly draw up the pelvic portion of the fractured bone out of the line of the lower one, and to bring down which, the muscles in front are pressed against the projecting edge of the fracture, making another source of irritation. From the straight position it keeps the limb in, the sartorius is not relaxed, but is left in action, twisting the lower fragment on the upper one at the point of fracture by its oblique course over the thigh and insertion at the inner side of the head of the tibia. It is this action of the sartorius that twists the knee outwardly, and with it the leg and the foot—exacting clumsy appliances to correct a created fault, and one that ought not to exist. Maintaining the leg extended on the thigh does not relax the flexors of the leg—that is, the gracilis from the pubis, the semi-membranosus and semi-tendinosus from the ischium to the head of the tibia, and the biceps from the ischium to the head of the fibula—but keeps this large mass of posterior muscles on the stretch, constantly tending to draw one fragment past the other, and so shorten the limb.

The double-inclined plane has one merit—that of not pressing the muscles in front against the fractured edge, or of attempting to bring the upper fragment into line with the lower one; but it brings the lower fragment into line with the upper one. Beyond this, the double-inclined plane is as useless as the short splints, since it is applied to only *one* limb, and imperfectly to the pelvis, leaving the fracture subject to the numerous motions of the body, and to consequent displacement. It has never given satisfaction, has given much trouble, and is now justly abandoned.

While all these modes of treating fracture of the thigh are physically and anatomically defective, none of them admit of the patient being transported from room to room or to distant places, without injury and risk. They are all followed by shortening, more or less deformity of the limb, sometimes by an impaired knee-joint, and sometimes by absence of union, occasioned by the ends of the fracture

riding past each other, and permitting the intervention of soft tissues. Such results I had already seen when, in 1820, I had a case that terminated disastrously. The patient was a very fat man, and the fracture was at the upper third. The long splint was employed to effect counter-extension, but it failed in its purpose. His great mass of fat prevented the groin strap from reaching a resistant substance, as this constantly yielded to the pressure; besides that, the thickness of the thigh and groin gave so much obliquity to the strap that it acted more across than in the long direction of the limb; it soon became imbedded, chafed, and gave pain and irritation. Short splints were also employed to depress the cocking up of the pelvic fragment, but proved useless, since the groin prevented the top ligature from reaching high enough up to hoop and stave them down. The termination of the case was a shortening of more than *five* inches, the lower fragment running under and on side of the upper one; no union took place by reason of the intervention of tissues, and there remained great deformity. The reproaches from this bad case set me to thinking how the two essential elements for uniting a fractured femur could be obtained; that is, to keep the ruptured surfaces in proximity, and prevent motion between them. The first required relaxation of the flexor muscles of both the thigh and leg; and the second required that the pelvis and *both limbs* should be confined. These ends are attainable by a *triple* inclined plane, secured in a suitable frame to admit of transportation.

NELSON'S TRIPLE INCLINED PLANE.



CONSTRUCTION OF THE FRAME.

Let an outside frame, A, be constructed of board about six inches high, thirty wide, and six feet, four inches long. Along the lower edge of this first frame, on its inside, let a cleat be nailed, on which the second or inside frame is to rest. This inner frame is the important part of the apparatus, and is to be of dimensions to fit the

inside of the first one. This inner frame is cut into three lengths, B, C, D; one for the head, trunk and pelvis to rest upon; the next portion, C, for the thigh; and the other, D, to support the leg. Each piece is to have a bottom made of slats, cane, cord, or tick, to support the bed. The thigh-piece must hinge with the trunk-piece into the outward frame at the centre. The leg-piece hinges on the top bar F of the thigh-piece, which bar is movable, up and down, by means of a fixed screw, G, let into a slit cut into the sides of the distal end. Turning the two screws will have the effect of moving the top bar up or down, and by this means the length of the thigh-piece can be made to suit a long or a short thigh. A trap-door, H, is cut into the lower board of the thigh-piece, about six or seven inches long and four wide, to serve for the evacuations, through which they can pass without disturbing the patient.

The next and last article to be constructed is the mattress, made of curled hair, husks or folded blanket, divided into two portions, one for the trunk to lie on, and the other for the thigh and leg. The thigh mattress must have a piece of the size and place of the trap cut out, and this piece so taken out of the mattress is to be bound round with perpendicular sides, so as to fit exactly the part whence taken. It must be well quilted through to preserve its shape, otherwise it might become pressed askew, and then not give equal support to both ischia. The part of the mattress whence the plug just mentioned has been removed is to have perpendicular sides also.

The mattress is laid on a frame, and over it a sheet, with a long slit in the centre opposite the trap. This sheet ought not to be of hard smooth-ironed linen, for such is apt to chafe soon; cotton is not so bad; the best material is a soft woolly blanket, for on this the ischia and sacrum can repose for a long time without heating or chafing.

All is now ready for use, placed close to the patient. Lift him on to the centre. Next, elevate the trunk-piece about 20 or 25 degrees. After that, raise the thigh-piece about 35 degrees; the leg-piece will fall naturally by its own weight and catch into the notches of the cleat below, and in this way secure the thigh and leg at proper angles. When all this is done, lengthen or shorten the length of the thigh-piece by turning the screws G, which will cause the distal bar F of the thigh-piece opposite the ham to ride up or down until it has reached the correct length of the sound femur, and, of course, adjust and reduce the fractured one to a corresponding exactitude. It will now be found that the projection of the upper fragment ceases to bulge out the muscles, since the lower fragment is brought into line

with that of the upper one, flexed as far as the iliacus and psoas can draw it; that the "extension" is correct, since both thighs are brought to an equal length.

Should shortening have occurred, it would be well to adjust it a little longer than the correct length, and suffer the pelvis to hang by the hams a little while. This will have the effect of drawing the fragments apart sufficiently to disengage any fibres of muscle that may have intervened. After a short delay, turn back the screws as much as will suffer the sacrum to bear on the bed.

All this placing and adjusting is performed without manipulation of the limb, or "setting," as it is called; without pain or violence; without the faulty and inefficient *extension* attempted by means of the long splint. The weight of the trunk slides the pelvis down against the raised thigh-piece; the weight of the pelvis draws the pelvic fragment with itself. The elevation of the thigh brings the lower fragment into line with the pelvic one; the leg, hanging at the ham, across the last bar of the thigh-piece, draws the lower fragment away from the upper one, and completely prevents contraction; in this way *natural* extension is attained without recourse to the long splint, its straps, bandages, chafing and pain.

The leg, lying on its frame, nearly at right angles with the femur, permits of the complete relaxation of its flexors attached to the ischium and pubis. The sartorius is also relaxed by the flexion of the femur on the pelvis, leaving it no power to turn the foot outwardly, since the knee-joint is a hinge incapable of rotation, and is kept in correct position by the mere weight of the leg. Hence it is that none of the clumsy appliances had recourse to when the long splint is used are now needed to rectify a foot that is not and cannot be out of place.

Bandages and short splints may be dispensed with; but, as the muscles are apt to twitch at times, and become flabby, a many-tailed bandage may be lapped over the thigh, and a short splint, merely to subject the muscles.

The frame, with the patient on it, may be placed in any convenient part of a room, or removed to another at will, and in summer carried into the yard or garden for the sake of air or recreation; but care must be taken that it rest on the trestles, two chairs, one at the head and foot, or on a table, quite *level* transversely; for, if not, the patient will sag towards the lower side, and derange his position. This fault is remedied by simply putting a wedge under the lower side.

At the time of defecation, open the trap, remove the mattress

plug, and place the vessel to receive what passes. The operation over, let the nurse wipe the patient, and any part of the mattress soiled, with a cloth or sponge wetted. After this, replace the plug with *exactitude*, so as to make the mattress full and even; shut up and fasten the trap against it. For the urinary discharges, pass a length of "tubing" between the plug and mattress, out through the trap, the lower end resting in a vessel, and the upper one fitted with a funnel, properly shaped, for male or female, to lie in the perineum, to be used by the patient at will, without the aid or even knowledge of persons present. In this way the patient is kept clean and dry.

Every well-conducted hospital ought to be provided with the frame and bed just described; and the country surgeon in large practice will find it a satisfaction and a profit to keep at least one in readiness for an emergency. Should he have none when called to an accident, he can easily improvise one with the aid of a joiner in a few hours. In the case of children, a convenient frame can be quickly made with two pieces of board—one to serve as a platform for the other, which is to be sawn into two—one-half for the body to lie on; the other half, sawn into two; one portion for the thighs, and the last for the legs to rest on. The body and thigh-pieces to be fixed to the platform-piece with leather or other hinges. Both boards to be cut out, and the thigh one fitted with a trap. The best kind of mattress for a child is made by folding a woolly blanket into several plies; or a *comfortable* will answer; of course the plug must be cut into this, as in the case of an adult. In children, I have found it useful in practice to pass a roller across the pubes and ilia, and tie the ends under the trunk-piece; the same, in cases of *delirium tremens*, will effectually confine the patient. This mode of treating children has many advantages over any other; two may be mentioned: 1st. The difficulty of splinting their fat thigh is avoided; next, 2d. A child is fretful when left without company, as in the case of poor people. The mother can do her work, and carry her child to be present and amused.

This mode of treating fractured thigh is useful in many disorders of the lower limbs; as in hip-joint cases—even to lie on at night in the early stages of coxalgia—in cases of resection, sinuses, &c., and admits of cleanly dressing.

Cases.

I think it proper to cite a few cases out of many as illustrative of its utility:

1. A lumber-man, the owner of many rafts, was on his way to his contractors, when the raft he was on was wrecked in shooting the Crochet

Rapids. He and his men, and his timber, were tossed to and fro in the cascade until they floated into smooth water; he, with his thigh broken, was hauled on the beach. I sent to him one of my frames; put him upon it. By this time the logs were again cribbed and rafted; and he, well understanding his case and the use of the frames, insisted on continuing his journey. He was embarked on his raft, went to the end of his journey, a distance of over two hundred miles, was carried to a hotel in Quebec, where he settled accounts with his employers; after this, was placed on a steamer and arrived in Montreal after a six weeks' travel, having suffered no interruption in his affairs, and having traveled, in all, over four hundred miles. In Montreal he was taken off his bed perfectly cured, without shortening or any other defect.

2. A drover was knocked down by his cattle and had his thigh fractured obliquely, the sharp end of the pelvic fragment protruding. Having placed him on the frame, by lengthening the thigh-piece by means of the screws over an inch and a half, his pelvis hung by the hams across the top of the leg-piece; the protrusion was soon and easily drawn in. In two days he felt so comfortable that, without consulting me, he started for his home, above one hundred miles distant in the "Eastern Townships," across several large rivers, and over bad mountain roads. He arrived safely, and recovered without defect.

3. A priest fell on the curbstone and fractured the femur. He was taken to the Hôtel-Dieu Hospital, in Montreal, placed on one of my frames, and carried by his parishioners to his home, Chambly, where he perfectly recovered.

4. A young gentleman, a student at the College of Fordham, N. Y., aged about 18 years of age, broke his thigh in 1841. The neighboring surgeon attended to him in the usual way. About the fifth day he suffered so much pain that I was sent for. I found the limb over two inches short. With the aid of the man-of-all-work at the establishment, I succeeded in extemporizing a frame, in about three hours; put the patient on it, and in a short time the weight of his own body reduced the fracture and restored the length of the limb without any of the usual attempts at extension. He recovered symmetrically.

5. Mrs. Graham, 62 years of age, was run over by an omnibus in Broadway, on New Year's Eve, 1845; the wheel passing over the thigh, fractured it. This occurred at her own door; she was carried at once to her room and disposed of in the best way for the time. In a little over a day a frame was constructed, on which she was placed;

the very frame now in possession of Dr. Arnold, of Yonkers, who has used it with perfect success, and exhibited it to the N. Y. Academy of Medicine. Mrs. G. recovered perfectly, symmetrically, without any perceptible difference in the two limbs. This venerable and highly respectable lady, known to a large circle of the old families of New York, is still living, aged 78, and a few days since walked nearly five miles. No one can perceive the slightest halt in her walk.

6. A young lady was so treated before Mrs. Graham. She is now one of the attractive women in Baltimore, and dances to perfection, no one being aware of the slightest defect.

QUARTERLY REPORTS ON MEDICAL PROGRESS.

REPORT ON SURGERY.

I. *Polypi of the Male Urethra, with Perforation of that Canal.* By Dr. Beyran. (Extract from a paper read before the Société Chirurgicale. L'Union Médicale, No. 96, August 14, 1862.)

II. *A Successful Case of Transfusion in Puerperal Hæmorrhage.* By Dr. Weickert. (Deutscher Klinik, June, 1862. Journal de Médécine et de Chirurgie, September, 1862.)

III. *Two Cases of Hypogastric Puncture of the Bladder performed upon the same Subject, with an Interval of Seven Years between the Operations.* By M. Chassanial, Second Physician-in-Chief of the Imperial Marine. (L'Union Médicale, September 13, 1862.)

IV. *On Cauterization of the Omentum after the Operation for Umbilical, Inguinal or Crural Hernia.* By Dr. Phillipeaux, of Lyons. Read before the Société Chirurgicale of Lyons, at its Meeting of July 23, 1862. (Gazette des Hôpitaux, August 7, 1862.)

V. *Of Various Procedures applicable to the Treatment of Ranula.* (Journ. de Méd.; Dublin Medical Press, November 19, 1862.)

I. Urethral polypi are very rare among males. I have had in my practice quite a large number of diseases of the genito-urinary organs, without ever meeting with an instance of it. Last year only, for the first time, I had occasion to note and to treat these polypi, in the case of a hypospadiac, who, experiencing difficulty in urinating, imagined that he had a stricture. It was in fact for this latter affection that he had up to that time been improperly treated, as we shall presently see.

Fungous growths of the urethra are incomparably less frequent among men than among women. The ancients have not only made no mention of this disease in respect to males, but they even seem to

have known nothing about it. We must come down to 1835 before finding any details upon this subject in the writings of authors. Nicod is considered as the first who has made mention of it; but on consulting his book, entitled *Treatise upon Polypi, and other Fleshy Growths of the Urethral Canal and of the Bladder*, we cannot fail to remark that this author was most profoundly ignorant of the disease which he proposed to describe.

Urethral polypi among men were not really distinguished from other diseases of this canal until 1836, and it is to M. Velpeau that we are indebted for this definite knowledge. At this period, this surgeon demonstrated that urethral polypi, although relatively more frequent among women, still existed none the less among men. "Men," says he, "may equally be disposed to this sort of polypi: I now have two cases of them: in one, the excrescences, three in number, are scarcely equal in size to a grain of barley; in the other case, that of a young Englishman, these excrescences were still smaller. Their insertion was in both instances behind the urinary meatus. In neither case did any reappear, after having been crushed or excised.—(*Médecine Opératoire, 2d édit.*)

However this may be, the following case of the patient whom I treated seems to me to be one of special interest, by reason of the complications which these polypi presented relatively to the urethra:

Mr. D., twenty-six years of age, of sanguineous temperament, robust constitution, issue of healthy parents, never himself had either blennorrhagic flowing, nor chancres, nor other venereal diseases. He always enjoyed good health, but was troubled with a defective conformation of the urethra, or hypospadias, characterized by imperforation of the gland, and by the abnormal opening of the urinary meatus below and behind that part of the organ.

Micturition was freely and easily performed until 1860, at which period, for the first time, Mr. D. felt an abnormal sensation—a sort of obstruction in the urethral canal. This uncomfortable sensation was soon followed by difficulties of micturition, characterized by heat, smarting, and swelling of the penis at the moment of the passage of the urine. It seemed to him that a mechanical obstacle hindered the urine from issuing by the meatus, and drove it back. The jet of urine was modified in issuing from this orifice; it was divided into an infinitude of small streams, like a liquid falling through the perforations of a watering-pot.

The patient went to see a physician, who thought he had to do with a stricture, and consequently treated him by dilatation of the

urethra. But each introduction of the bougie, far from dilating the canal and affording him relief, caused the patient intense pain, followed by flowing of blood. This treatment, employed without success for a month, resulted at first in inflammation, and afterwards in perforation, of this canal, behind the urinary meatus.

Thus discouraged, the patient then gave up all treatment, and confined himself for several months to taking warm baths.

In the month of February, 1861, seeing that his condition remained about the same, he called upon Dr. Girardin, who kindly confided his treatment to me. His condition at that time was as follows:

His well-developed genital organs were, with the exception of the opening of the meatus, in a normal condition. There was hypospadias; the gland was imperforate; the urinary meatus was below, and $\frac{4}{5}$ inch behind, the highest part of the gland. The prepuce, very slightly developed, did not cover over these parts. Two-5ifths of an inch behind the abnormal meatus, and along the course of the urethra, there was a solution of continuity or crack, whose slightly separated edges presented a length of $\frac{1}{3}$ inch antero-posteriorly.

This accidental opening was not unobstructed; on separating its lips and turning them outwards, there appeared on their internal face soft, fleshy excrescences, of a scarlet color and rounded form, about the size of a small pea, and having remarkable vascularity; they bled with the greatest readiness, and were held merely by a slender pedicle fastened in the urethral mucous membrane. I could count four of them; that is to say, two on each side of the opening in question. A stylet introduced by this opening at first met with some difficulties in penetrating, but by pushing it back and forth, it was arrested at a distance of about $\frac{2}{3}$ inch; if slight force was used, the stylet traversed the meatus, which was also obstructed. This exploration caused an escape of blood.

The examination of the abnormal meatus demonstrated, in its turn, the presence, in this orifice, of three polypi; smaller, however, than those situated at the accidental opening of which I have just spoken. These three polypi were quite visible upon the inferior wall of the meatus; they were about the size of a grain of barley, and presented the same characteristics as those of the fistula.

These fleshy excrescences became more manifest during efforts at micturition; this function was itself performed with difficulty; the urine issued in great part by the accidental opening, and in small quantity by the abnormal meatus, which permitted the liquid to flow like a watering-pot.

At the moment of micturition, the penis became slightly enlarged, and the patient then experienced in the canal a sensation of tension, at times very painful; the first and the last portions of the urine were sometimes bloody. These morbid phenomena disappeared after micturition.

During erection, the penis became somewhat painful, especially in the urethra; and during the ejaculation, the patient experienced a painful tension; a tearing sensation throughout the entire length of the canal; a sensation accompanied by rectal tenesmus and tingling in the perineum. He also remarked that after coition, the semen issued slowly and in very small quantity at a time, through the artificial opening.

Treatment.—I excised these fleshy excrescences by means of curved scissors, and the bleeding was checked by cauterization with a pencil of nitrate of silver. In the evening the bleeding recommenced, which necessitated a new cauterization, and the introduction into the urethra for twenty minutes of an elastic bougie, $\frac{1}{8}$ inch in diameter, which passed through the entire length of the canal without difficulty; a thing which was not possible before the destruction of the polypi.

The next day a new cauterization. On the day following, the introduction of a bougie, $\frac{1}{6}$ inch in diameter, covered with a calomel ointment, which I left in the canal for twenty minutes.

In short, the treatment lasted one month, and consisted in the employment of bougies every three days consecutively, and cauterization on the fourth day. At the end of that time the calibre of the bougies had reached $\frac{1}{3}$ inch, nearly.

I should remark that these bougies were always covered with the ointment of calomel and savin, to the use of which I attach some importance.

This treatment, thus combined, resulted in the definitive cure of these polypi. Although the abnormal meatus and the accidental opening had become perfectly free, the urine still issued in great part by this latter opening, a complication which demanded an especial treatment. To obviate this inconvenience, I cauterized the edges of the urethral fistula, and directed the patient to close the opening with his finger, at the moment of urinating. He did so more than a month without any result. I was then compelled to give up this method, and undertook to vivify the edges of the fistula to bring them together, and to fasten them by means of fine straps. Having once more failed, I finally had recourse to the use of flexible sounds of large calibre during micturition, for it was absolutely necessary that the contact of the urine,

which alone prevented reunion, should be avoided. This method was employed during four weeks, at the same time that some slight cauterizations favored the reunion of the edges of the wound, and at the end of a month it was so much reduced that it would hardly admit the stylet. This fact was noted by M. Jarjavoy, who kindly visited the patient with me.

II. Transfusion is no longer a new operation, but successful cases are not yet so numerous that we may not be permitted to mention such as from time to time illumine the medical horizon. The *Deutscher Klinik* of the 7th of June, 1862, contains a case which, from this point of view, is worthy of mention. It was that of a woman recently confined, to whom all sorts of hæmostatics had been applied in vain to arrest a frightful loss of blood. Syncope, coldness of the extremities, absence of pulse, alteration of the eyes, all announced impending death, when Dr. Weickert, who reports the case, decided to try transfusion of blood.

One of the children of the patient, a robust lad, seventeen years of age, furnished the blood necessary for the operation. The left median vein which was to be opened, was first laid bare the length of an inch, and throughout this length was freed from the areolar tissue. Afterwards there was carried into the venous tube a trocar, whose canula served to introduce the syringe which conducted the liquid. In addition, a thread was passed under the vessel, which was thus raised up, and was pressed against the instrument every time that a sudden jerking movement of the patient interrupted the injection. To perform this operation, Dr. Weickert employed Martin's apparatus; and as, above all things, this surgeon was desirous to prevent the coagulation of the blood, he took the precaution to permit each time only so much of the fluid to issue from the vein as would suffice to fill the tube of the syringe; unfortunately, this precaution had an unexpected result, which was near being disastrous. In short, after two or three aspirations, corresponding to so many little bleedings, the young lad fainted, and it became necessary to complete the operation by calling upon a young girl of vigorous appearance, who very kindly made sacrifice of a portion of her blood. Thanks to these two loans, the indication was fulfilled; the patient rallied, and after a regular confinement, again enjoyed perfect health.

This result is the more remarkable because the operator was unable to avoid the coagulation which he feared. Not only did the blood become solidified in part in the syringe before the piston had traversed the length of the tube of the syringe, but it even coagulated in

the vase into which it was received on issuing from the vein, although M. Weickert caused the vase to be warmed, and raised the temperature of the syringe to nearly the same degree. M. Jaccond, who has very judiciously appreciated the value of this fact, justly remarks, that M. Weickert in this respect did precisely what was necessary to run counter to his own purpose, and to hasten the coagulation of the blood. The experiments of Hunter, of Hewson, and of Scudda-more, have afforded an unanswerable demonstration of this fact. It seems even to be established that the temperature best suited to produce coagulation is precisely that of the animal to which the blood belongs. The researches of Davy, on the other hand, have shown that at 32° the formation of the coagulum is retarded one hour. M. Jaccond does not pretend, we may infer, that it is necessary to cool to this point a liquid which is to be injected into the veins of an individual whose normal temperature is from 98 to 100°; but as the most favorable limit is not yet known, in the opinion of this physician, it would be better to search for it experimentally, than blindly to obey a precept which has no other justification than mere routine.

III. On reading in the *Répertoire Générale des Sciences Médicales*, that Professor Roux had never been compelled to puncture the bladder, and that, too, after thirty years' of practice in one of the largest hospitals, I have thought it my duty to state that in the Ethiopian race cases of retention of urine, necessitating this final resource, are more frequent than among Europeans. The most ordinary cause is that of numerous contractions of the urethral canal, in consequence of frequent blennorrhagiæ, which are rarely treated in a rational manner.

In the course of the month of June, 1859, I was notified by the chief of the clinic in the St. Louis Hospital (Senegal) that a negro had come into the surgical wards suffering from complete retention of urine. I went immediately to the patient, who, on recognizing me, showed me above the pubis a small scar, having the triangular form of a mark made by a large leech; and then begged me immediately to pierce his abdomen anew. But at the time of the first puncture, which had taken place about seven years before, the chances of success were greater, while at this last time the patient was greatly weakened by long suffering, due to old contractions of the canal, which occasioned for a long time an almost total suppression of the urine: hence the evident consequences of the accidents of resorption, extreme emaciation, perspiration having the odor of urine, pulse small

and very frequent, diarrhœa, vomiting, &c. As a matter of course, before the operation, all the efforts of catheterism were fruitless.

Not only were there numerous and insurmountable contractions throughout nearly the whole of the urethra, but there was also, if not a formal counter-indication, at least a serious obstacle to the performance of the operation known as the button-hole operation, in consequence of a considerable and *partial* swelling of the prostate; an accident which, in its nature, is more formidable, as is well known, than the swelling of the entire gland, since in that case the urethra is found diminished and naturally put out of place, and hence great exertions and great care are required to find, during the operation, the orifice leading into the bladder. I thought proper, therefore, as a last resort, to make a second puncture, three centimetres above the pubis, and near the first cicatrix.

A considerable quantity of urine was evacuated; then replacing, forty-eight hours afterwards, the metallic canula of the curved trocar of Brother Côme, with a gum-elastic sound slipped within the former, I directed all my attention to the restoration of the normal course of the urine, but in vain. The patient, eight days after the puncture, although he frequently withdrew the sound in spite of us, still continued, without immediate accidents, to urinate by an artificial canal; a fact which has already been reported by Adolphe Murray.

I am convinced that this man, who lived more than two months after the operation, would have recovered, if the bladder, which did not empty itself completely, had not kept up a slow resorption, which could not fail to be fatal to him.

Of the three methods pointed out by authors, the hypogastric puncture seems to me almost harmless; while that which consists in puncturing the recto-vesical partition, or the Fleurant process, which I have once performed, gave me great anxiety. As to the puncture through the perineum, for which we are indebted to the lithotomist, Tolet, I think it should be even less frequently followed than that by the rectum, since to the danger of wounding, as in the former case, the diffrent conduits or the vesiculæ seminales, there is also added the formidable difficulty of having to traverse a more considerable thickness of tissue, and hence, as a more frequent consequence, greatly-to-be-dreaded accidents of urinary infiltration.

IV. When, in an operation for strangulated umbilical hernia, we find a portion of the omentum, the course to be pursued presents great difficulties.

Science is far from having definitively settled upon the method en-

titled to preference, for all those pointed out by authors are attended by grave, and frequently disastrous results.

These sad consequences are encountered after the employment of all the methods proposed up to the present time, namely:

1. Reduction, preceded or not by section of the adhering parts.
2. Abandonment of the omentum in the wound.
3. Excision of that part of the omentum which protrudes beyond the hernial ring.
4. Ligature, either immediate, according to the process of Celsus and Daruan, or performed after the development of fleshy granulations, as advised by the celebrated Scarpa.

Can cauterization be a satisfactory substitute for the insufficiency of all the methods we have just enumerated? No reply to this question can possibly be found in the old authors.

Although cauterization is mentioned by Celsus and Scarpa, we shall search in vain in their works for precise rules in reference to the employment and choice of caustics, and as to the effects which may be expected from their use. Moreover, in their precepts, mention is made of a superficial cauterization merely, very different from that which is designed to totally destroy the omentum.

To the surgeons of Lyons, always the supporters of this method of treatment, belongs the honor of filling up this void, and supplying what was lacking.

M. Desgranges has employed the following method, which seems to me preferable:

If the omentum is free and without adhesions, it is thrown back upon the abdomen, above the orifice of the hernia; it is held in a split compress, covered with cerate on either side, and designed to protect the wound and the surrounding organs. It is unfolded, and spread out in such manner as to present a slightly extended surface, susceptible of being cauterized in twenty-four hours. After being thus isolated, its pedicle is held between two morsels of the paste of chloride of zinc, a few millimetres above the orifice of the hernia, protected by the compress. This dressing is kept in place by a woolen bandage. These precautions are sufficient to keep down the hernia, and to prevent the caustic from spreading beyond the portions to be cauterized.*

If cauterization, employed to charm away the accidents of keloto-

* *De la Cautérization de l'Epiploon dans l'Opération de la Hernie Etranglée:* Vissagnet doctorial thesis. Paris, 1858. Pp. 22.

my, had been utilized only four times, we would have no right to claim for it the rank which it ought to hold in surgical therapeutics. Four facts are not sufficient to determine the value of a curative method, but cauterization having been made use of very many times by several surgeons in cases of inguinal and crural hernia, with very satisfactory results, I may be allowed to base upon these facts a claim in favor of cauterization for the first rank among the methods suited to assure the safety and efficiency of kelotomy.

M. Bonnet has operated once successfully for inguinal hernia; M. Barrier has obtained a like result in another case—that of a woman; M. Desgranges, who has performed 17 analogous operations, has had 13 successes to 4 deaths. I have myself performed cauterization in the case of a woman, and have succeeded.

In cases of crural hernia, M. Bonnet has had out of 3 operations, 3 successes; M. Valette, one operation and one success; M. Barrier, one operation and one success; M. Desgranges, out of 8 operations, 7 successes and 1 death.

Now that I have stated all the successful and disastrous cases in which cauterization has been employed, it will be easy for me to demonstrate the superiority of cauterization over the ordinary method, by setting forth the following statistics:

Umbilical Hernias.

MM. Bonnet.....	2 operations...	2 successes.
Desgranges... .	1 operation	1 success.
Valette.....	1 "	1 death.

Inguinal Hernias.

MM. Bonnet.....	1 operation	1 success.
Barrier	1 "	1 "
Desgranges.....17 operations.....	13 successes.
"		4 deaths.
Philipeaux	1 operation	1 success.

Crural Hernias.

MM. Bonnet	3 operations.....	3 successes.
Barrier	1 operation	1 death.
Desgranges	8 operations.....	7 successes.
"	" "	1 death.
Valette	1 operation	1 success.
Total.....37 operations.....	30 successes.
		7 deaths.

And furthermore, while we find out of 32 operations for strangulated hernia performed at Paris, 29 deaths and 3 successes, we can show by the Lyons method—that is to say, by means of cauteriza-

tion conjoined with kelotomy—out of 37 operations, 30 successes and 7 deaths.

If, now, my statistics are compared with those of Professor Malgaigne, the result is still more striking.

Out of 183 operations of inguinal, crural, and umbilical kelotomy, this learned professor met with 114 deaths; while I, out of 37 operations by means of cauterization, find 30 successes and 7 deaths; and of these seven failures, there are as many as four, according to M. Vissagnet, which should not be attributed to this method of treatment; as, for instance, two patients operated upon while in a condition of profound adynamia, sank in death without showing any signs of peritonitis; a third patient died in consequence of a preternatural anus, as is the rule in like cases; and a fourth had already nearly recovered, when a late perforation of the intestine brought on stercoral peritonitis, and death.

At any rate, these statistics, all in favor of cauterization, are worthy of being made known, for they are based upon an assemblage of facts which prove incontestably the advantages of this method of treatment.

V. Much has been said of ranula, and the result of universal experience is, that a procedure which succeeds in one instance, entirely fails in another. Hence the necessity of describing, from time to time, the new methods proposed for the cure of a disease which too often baffles the ingenuity of the surgeon. Amongst the recent cases published in the medical journals, or observed by ourselves in the hospitals of Paris, several speak highly in favor of the seton and of drainage. The *France Médicale* relates an instance in which the disease had lasted three months, and in which M. Foucher, surgeon of the hospitals, inserted transversely into the tumor a seton consisting of three threads; two tea-spoonfuls of the characteristic fluid escaped, and the consequences of the operation were most satisfactory. Adhesive inflammation induced the gradual atrophy of the cyst, the threads were withdrawn on the eighth day, and after an interval of forty-eight hours the patient, a woman of thirty, was discharged entirely cured, and suffering no inconvenience in speaking or in mastication.

M. Chassaignac is in possession of the particulars of a dozen cases of ranula, in which he resorted to drainage with the most perfect success. His method consists in passing with an incurvated trocar a fenestrated india-rubber tube through the tumor. The extremities of this tube are then tied to each other so as to form a small ring, which fits behind the teeth, and may be left for several months, without much inconvenience, *in situ*.

In these cases the ranula consisted in a dropsical condition of the serous bursa which lies beneath the mucous flooring of the mouth, and bears the name of Fleischmann's bursa. Another variety of the same disease appears to consist in the accumulation of mucus in some of the follicles situated under the tongue. In this form of ranula the parietes of the tumor are thin and translucid, its contents are gelatinous, and a relapse infallibly occurs after a short interval if mere incision has been resorted to. For *follicular ranula*, M. Chassaignac has recourse to excision combined with the application of lunar caustic. He removes with scissors the entire wall of the tumor down to the points in which it is continuous with the mucous membrane. In a case of this description, M. Foucher applied with success M. Jobert's hem-suture. He detached the mucous membrane, exposed the cyst, a part of which he removed, and turning down the remaining portion, so as to place it in apposition with a bleeding surface, secured it in this situation with a suture.

While alluding to drainage, we should not omit to say that M. Pauli, a surgeon practicing at Landau, instead of Dupuytren's double button, employs a hollow, jointed ring, each half of which is supplied with two apertures. This appliance induces the suppuration and subsequent contraction of the cyst, without inconvenience to the patient.

The *Presse Médicale Belge* also inserted this year in its columns a communication, in which M. Deroubaix's hospital practice is described. We extract the following passage: "M. Deroubaix, in the first place, lays open the cyst by a liberal incision close to the posterior surface of the maxilla. He grasps the posterior lip of the incision with the forceps, and removes with curved scissors a portion about ten lines in width by fifteen in length. The cavity is then cleansed of its ropy and adhesive contents, and the loss of substance presents the aspect of an oval-shaped aperture, limited near the jaw and near the tongue by a margin sufficiently broad to admit of the insertion of sutures. A silver ring (strong enough to resist the pressure of the tongue, but so flexible as to be easily moulded to the form of the artificial orifice, and to adapt itself within the mouth) is placed in the wound, and secured to its margin by eight sutures. At the conclusion of the treatment, in order to avert the possibility of the ring being swallowed during sleep, it is attached with a wire to one of the teeth. This procedure absolutely prevents the edges of the wound from closing before its fundus has granulated and healed. Premature cicatrization is thus hindered, and may be delayed as long as the surgeon deems necessary."

The author conceives that this procedure is open to none of the objections which have been raised against the methods in use hitherto; and in the case he relates, a complete and permanent cure was effected.

REPORT ON PHYSIOLOGY.

I. *Engel's Theory of the Development of the Animal Egg.* (A Text-Book of Midwifery, by Dr. CARL R. BRAUN, Professor of Midwifery in the Imperial Hospital, Vienna.)

II. *Investigations concerning the Physiology of Smooth Muscular Fibres.* By Prof. A. FICK, of Zurich. (Wiener Medizinische Wochenschrift.)

III. *Infants with Teeth at Birth.* Prof. GEORGE T. ELLIOT, JR. (American Medical Times, Nov. 1st, 1862.)

IV. *Experimental Researches into a New Excretory Function of the Liver; consisting in the Removal of Cholesterine from the Blood, and its Discharge from the Body in the Form of Stercorine—(the Seroline of Boudet.)* By AUSTIN FLINT, JR., M.D., Professor of Physiology and Microscopy in the Bellevue Hospital Medical College, New York. (American Journal of the Medical Sciences for October, 1862.)

I. Prof. Engel,* of Vienna, has endeavored to build up the history of the development of the animal egg in accordance with the inductive method; and, fortifying himself partly by observations, partly by measurements and analogies, to attribute to apparently disconnected facts their import and significance; thus abandoning, as far as possible, the domain of hypothesis.

In order to compare the views of Prof. Engel with the opinions which have heretofore prevailed upon the subject of development, and which have been given in brief in the preceding section, I here introduce a few fragmentary extracts from his excellent treatise:

The disappearance of the germinative vesicle is generally accepted as one of the first results of fecundation. This fact Engel explains by supposing a segmentation of the vesicle into a vesicular blastema. After the furrowing of the yolk has taken place, we distinguish in the egg the following elements: 1. The pellucid zone; 2. The thin stratum of blastema, still remaining between the layers of the vitelline membrane, (which, it must be remembered, is by no means so distinct as the external membrane of the pellucid zone,) from which the germinal eminence, and, secondarily, from the latter, the central cavity is developed.

* Prof. Engel: Ueber die ersten Entwicklungsvorgänge im Thierei und Foetus. Juli heft, 1853 der Sitzungsberichte der mathem. naturw. Classe der kais. Academie der Wissenchaft in Wien. Bd. XI. § 223 (ἡ ἐυρησις, Erforschung.)

The blastemal layer of the germinal eminence splits into an external (serous) and an internal (mucous) layer. Engel does not retain the terms serous and mucous layer, because he considers that neither from the animal nor from the vegetative layer does any organ or the germ of any organ originate; the fœtus being more properly developed between them.

Fig. 1.

The *unfecundated* egg consists of a thick, structureless membrane, (the pellucid zone,) containing a viscous consisting of the germinative vesicle and the yolk, and fluid. On its inner surface is seen the germinal mass, surrounded by a membranous stratum of blastema. In the *fecundated* egg the pellucid zone still remains.

The germinal mass becomes the germ-sac, which is surrounded by a structureless, transparent wall, lying close to the inner surface of the pellucid zone, and called by writers the germinal membrane. The sac consists, therefore, of a double layer of membranes; but only at one point are these layers distinctly apparent. The superficial layer, heretofore called the serous or animal layer, Engel denominates the external vitelline membrane; and the second, or so-called mucous or vegetative layer, the internal vitelline membrane, or grooved layer of the vitelline membrane. The egg of this period consequently consists of three vesicles, fitted one into the other, of which the innermost includes the yolk with the central cavity.

The stratum of originally amorphous plasma lying between the layers of the internal germ-sac is called by Engel the germinal stratum.

It is only, however, from the central portion of this stratum that the embryo is developed. The germinal stratum, as seen in transverse section, then consists of two trilateral bands of plasma, symmetrically placed, and inclosing on either side a portion which is circular in its outline. This circular portion, thus imbedded in the middle of the germinal stratum, is to be remarked as the first rudiment of the embryo, and is called by Engel the embryonal sac or embryonal germ.

Fig. 2.

Fig. 3.

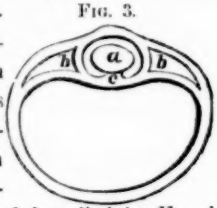


Fig. 1. Section of an unfecundated egg with (*a*) the germinative vesicle.

Fig. 2. Section of a fecundated egg, with the external and internal vitelline membrane and the germinal stratum.

Fig. 3. Transverse section of the egg and the germinal stratum. (*a*) Embryonal sac. (*b*) Trilateral bands of plasma. (*c*) Point at which the amniotic cells do not coalesce.

This germ is shut in upon all sides, and has no connection or communication whatever with the cavity of the germ-sac, being inserted between its layers. But we are not to suppose that it is throughout the entire substance of the germ even that the fœtus is developed; this process being confined solely to its interior, which we denominate the *medullary space*. The amniotic membrane, like all the serous membranes, is to be found with the earliest appearance of the fœtus.

They are developed, simultaneously with its origin, around the organs referred to them, without necessitating any inversion or secondary surface-growth.

According to Engel's explanations, the amniotic membrane originates as follows:

Imagine a parent-cell with its two secondary cells, in which a widening of the interval between the secondary cells has formed an internal space. This medullary space receives the first germs of the fœtus.

FIG. 4. FIG. 5. FIG. 6.

As the development of the fœtus progresses, the extremities of the secondary cells come into contact on its dorsal, but not on its abdominal aspect, and the surfaces of contact gradually flatten out, until, finally, the partition wall which they form breaks down, and the amniotic tunic is complete. Meanwhile, on the abdominal aspect of the fœtus the formation of new cells has been steadily progressing.

FIG. 7.

A comparison of the accompanying figures readily produces the impression of the gradual growth of a sac around the fœtus in such a manner as finally to envelop it completely. The probable connection of this sac with the tegumentary covering of the fœtus also suggests itself.

FIG. 8.

Fig. 4. A parent cell with its two secondary cells, designed for the formation of the amnion.

Figs. 5 and 6. Formation of an interspace by the separation of the secondary cells.

Fig. 7. (*m* and *n*) Bowl-shaped interspace between the two secondary cells.

Fig. 8. Coalescence of the two secondary cells posteriorly, but not on the abdominal aspect of the fœtus.

The amniotic tunic, therefore, originally envelops the fœtus as a simple, broad layer of soft, plastic material, which assumes a membranous consistence only on the addition of alcohol. When, with the growth of the embryonal sac, this layer also becomes broader, and separates into several segments, then for the first time is its proper membranous structure appreciable; the external layer and that next the fœtus increasing in thickness and becoming organized, (Fig. 8, A, e, f,) while between these two membranous lamellæ (f, d, c, e,) is found the amniotic fluid.

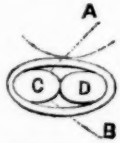
This fluid soon becomes much diluted in consequence of a constant aqueous secretion into the cavity, and collects in very noticeable quantity. The plasma, from which the amniotic tunic is developed, is present from the earliest origin of the fœtus.

The external layers of the germinal stratum now assume a membranous appearance, and the substance contained between them finally disappears entirely.

They are thus brought into contact, and unite to form the vascular layer of the germ, which consists, therefore, of two layers, which coalesce with the external wall of the germ-sac, on both its upper and lower surfaces. The vascular and the animal or serous layers of the germ attain consequently quite another significance from that usually ascribed to them. They are only transition formations, having nothing to do with the development of the system, the germs of which, according to the usual descriptions, they are supposed to contain.

We hence conclude that the first fœtal development takes place in the embryonal sac, (the external portion of which becomes the amnion,) and, to limit it still farther, in the medullary space of this sac. A transverse cleavage of the fœtal blastema produces two new secondary blastemas, giving to the transparent fœtal area an oval form. (Fig. 3, *a*.) The blastema of the medullary space is called by Engel the central germ. This does not communicate with the cavity of the vitelline sac, but forms a distinct ellipsoidal vesicle, which, by means of a longitudinal cleavage, is divided into two segments, presenting four spaces: A, the primitive or dorsal furrow; B, the inferior or abdominal furrow; and CD, the lateral spaces. (Fig. 9.)

Fig. 9.



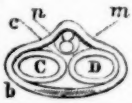
The central germ within the amniotic tunic, which has already formed a grooved inversion near the abdominal surface of the fœtus, is composed of three principal groups of vesicles, which subsequently develop into germs. Of these Engel has denominated one (A, Fig.

Fig. 9. The central germ of the embryonal sac.

FIG. 10.

10,) the germ of the dorsal column: this lies in the plane of the long axis of the future fœtus; the two others (C and D, Fig. 11,) are denominated the visceral germs or visceral sacs. While the former

FIG. 11.

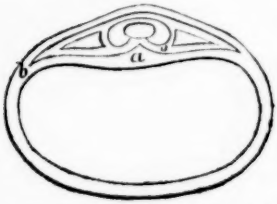


is being developed into the spinal marrow, and the membranes, bones and muscles appertaining to it, the latter begin their transformation also, and become the thorax and abdomen of the fœtus, with the organs therein contained. On a transverse section of each visceral germ (C, D, Fig. 11,) a perceptible difference is found to exist between its peripheral and central portions. The peripheral portion coagulates upon the addition of alcohol, and assumes a white color and membranous consistence.

The central portion, on the contrary, appears corrugated, readily falls out of the ring which surrounds it, and has early the yellow color of the yolk.

The open portion of the abdominal furrow of the fœtus is filled with a similar yellow mass, (Fig. 9, B,) and the germ still adheres to its vascular membrane, which, at that point, opens close to the yolk. (Fig. 12, *a*.) The appearance produced by these circumstances is as if the germ were in immediate contact with the vitelline sac, and were gradually severing itself from it.

FIG. 12.



If, during the first period of its development, we examine the germinal stratum, with the embryonal sac (vascular area, opaque and transparent fœtal areas,) from above, we distinctly recognize, in the vessels which first make their appearance, the original furrowings of the germinal stratum, and in the courses followed by the vessels the interspaces between the contiguous germs.

FIG. 13.

The terminal vessel, (Figs. 13 and 14,) known under the name of vena or sinus terminalis, corresponds to the circumference of the entire germinal stratum, and consequently lies at the end of the great

FIG. 14.

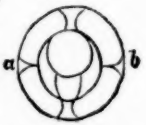


Fig. 10. (*A*) The germ of the dorsal column.

Fig. 11. (*C* and *D*) Visceral germs.

Fig. 12. (*a*) The germ connected with its vascular membrane, but not with the yolk.

Figs. 13 and 14. View of the Vena Terminalis.

longitudinal cleft by which it was divided before the formation of the embryonal sac had yet taken place.

This sinus terminalis curves like a bow towards the head of the fœtus, and thence towards its abdomen, and, following the longitudinal groove, reaches the latter in the inferior groove of the stratum.

Again, after the second segmentation of the germinal stratum is accomplished, vessels are observed proceeding from the abdominal region of the fœtus into the interspace between the anterior and posterior blastemal masses of the stratum and the embryonal sac on each side. These vessels, leaving the sides of the embryo at right angles, and still following this interspace, spread out in the plane of the stratum. In the mean time, in the stratum itself the capillary vascular apparatus has been developed in the interspaces of its numberless cells, and the first circulation has begun.

If now we examine the central germ, with its envelopes lying in the germinal stratum, laterally and in its longitudinal aspect, we see making its appearance from the middle of the stratum, (Fig. 12, *a*,) in the furrow to be found at this point, a vessel [a, b,] which runs in front of the capital portion of the embryonal germ, towards the extremities [superior and inferior] of the germ-sac. This is the lateral view of the vessel. (Fig. 14, *b*.) Running through the apparent inversion of the amniotic membrane—[this funnel-shaped inversion of the amniotic membrane is known under the name of ductus omphalo-vitellinus]—it there becomes connected with the visceral vessels. This vessel subsequently becomes the arteria meseraica, [mesenteric artery.]

In the central germ itself, meanwhile, as far at least as the anterior visceral sac is concerned, the formation of two new cells and their cleavage has taken place, all the interspaces thus formed between the cells being designed for the reception of the vascular canals.

Fig. 15.

In the subsequent development of the several organs of the embryo, Engel assumes the appearance and subsequent distinct limitation of numerous germ-cells, of a similar character to those just discussed.

II. Smooth muscular fibres respond to irritation not by a transitory contraction, but by tetanus. During its duration the same fibre can again be irritated by an influence of equal power with the first. Continued irritation increases the contraction to a certain point, which, being reached, an increased influence is required to continue the result.

Fig. 15. Cleavage of the anterior visceral sac of the central germ.

The intensity of electric irritation is, in its influence on smooth muscular fibres, totally independent of the varying density of the current. The contractions are the same whether the density of the electric current be gradually increased for fifteen seconds, or the influence suddenly interrupted. But, within certain limits, the power of the influence increases with its duration.

A smooth muscle shows no motion whatever when it is within the reach of inductive electricity, and the rolls are slowly advanced towards each other, until the muscles of the operator's hands are attacked by irresistible tetanus. The same muscle responds with energetic contractions to a gradually increased constant current long before this affects the nerves of the human tongue.

The effect is proportional in increase to the difference in the densities of the two currents between which it varied. With a proper selection of the intensity of the current and of the intervals, a very slow increase may produce twice as powerful a contraction as the momentary interruption of a weaker current.

Irritation may consequently be produced by an influence of short duration, provided the current has a certain power. Very quick, alternate shocks must be very powerful to affect smooth muscular fibres.

Sulphuric acid produces chemical irritation of these fibres—a solution of common salt not.

III. In the lying-in wards of Bellevue there are now two infants reported by Dr. Geo. T. Elliot, Jr., who were born with teeth, viz.: William Hoffman, sixth child, weight at birth six and one-half pounds, puny, fully developed; right middle incisor in lower jaw well formed and protruded, but placed athwart the jaw.

Annie Morse, first child, weighed at birth seven pounds, fully developed; two middle incisors in the lower jaw, both well formed, but loose; right incisor set obliquely in the alveolar tissue.

IV. The author of this interesting paper, the result of much patient thought and careful investigation, boldly claims for it an importance which can hardly be accorded to any discovery in our science since that of Dr. Bright. He says: "*What the discovery of the function of urea has done for diseases which now come under the head of uræmia, the discovery of the function of Cholesterine may do for the obscure diseases which may hereafter be classed under the head of Cholesteremia.*" And if his postulates be sustained by future investigations, and stand the test of time and the siftings of foreign experimentation, his claim will prove a just one, and America will have good reason to pride herself upon having added so useful a contribution to the sum of the

world's knowledge. Having exhibited the lamentable state of our ignorance upon the subject, he proceeds to state the purpose of his essay, as follows:

"We will find the cholesterine to be the most important excrement separated by the liver, as the urea is the most important one separated by the kidneys; and the study of this substance will necessarily involve the depurative function of the liver. I will therefore begin with the cholesterine, and endeavor to show where it is formed in the economy, by following the blood in its passage through various organs. This will necessarily involve a description of the chemical processes which have been employed in its extraction. I will then endeavor to show where the cholesterine is removed from the blood, by the same method of investigation. The next step will be to follow it out of the body, and study the change which it undergoes in its passage through the alimentary canal. Having described the process of formation in the tissues, separation from the blood by the liver, and final discharge from the body, I will endeavor to show, finally, the effects of interruption of this function of the liver upon the economy. This will lead us into pathology, and a host of diseases will arise which may be dependent on a disturbance of the excretory function of the liver. We will be enabled to draw the line more closely between conditions in which there is resorption simply of the innocuous coloring matter of the bile, and those diseases in which there is a failure to separate the excrements from the blood. These conditions, it is well known, are widely different as to gravity, and the distinction between them is of great importance. The latter condition, characterized by the retention of cholesterine in the blood, will be treated of under the name of *Cholesteremia*."

Passing by the History of Cholesterine and the mode of obtaining it from the blood, we proceed to give the author's view of its functions:

"*Cholesterine is an excrementitious product, formed in great part by the destructive assimilation of the brain and nerves, separated from the blood by the liver, poured into the upper part of the small intestine with the bile, transformed in its passage down the alimentary canal into stercorine,* (the seroline of Boudet, a substance differing very little from cholesterine,) *and, as stercorine, discharged by the rectum.*"

The question of its origin is thus stated:

"The next question which naturally arises is the origin of the cholesterine. When we examine the situations in which it is found, we find that it exists in largest quantity in the substance of the brain and nerves. It is also found in the substance of the liver, probably in the bile which is contained in this organ, and the crystalline lens, but with

these exceptions it is found only in the nervous system and blood. Two views present themselves with regard to its origin. Cholesterine is deposited in the nervous matter from the blood, or is formed in the brain and taken up by the blood. This is a question, however, which can be settled experimentally, by analyzing the blood for cholesterine as it goes to the brain by the carotid, and as it comes from the brain by the internal jugular. The cholesterine being found also in the nerves, and, of course, a large quantity of nervous matter existing in the extremities, it is desirable at the same time to make an analysis of the venous blood from the general system."

A series of experiments, preformed upon a dog, with a view to determine this point, he considers, "demonstrate the following facts: 1. That the brain contains a large quantity of cholesterine, (which had, however, been previously established.) 2. That the blood going to the brain contains a small quantity of cholesterine, while the blood coming from the brain contains a large quantity. 3. That the blood coming from the lower extremities and pelvic organs contains more cholesterine than the blood carried to them by the arterial system."

Further experiments which are detailed lead him to conclude that this substance "*is produced in the brain, and thence absorbed by the blood.*"

An analysis of the blood drawn from the paralyzed and the sound sides of paralytics affords evidence that the nervous tissues throughout the body have a part in its formation; while the following experiment is considered to prove that cholesterine is separated from the blood by the liver:

"*Experiment* 8.—A good-sized bitch (pregnant) was brought completely under the influence of ether, the abdomen laid freely open, and blood drawn, first from the hepatic vein, and next from the portal vein. The taking of the blood was entirely satisfactory, the operation being done rapidly, and the blood collected without any admixture. A specimen of blood was then taken from the carotid to represent the blood from the hepatic artery.

The three specimens of blood were then examined in the usual way, for cholesterine, with the following results:

	Blood. *grains.*	Cholesterine *grains.*	Cholesterine in 1000 pts.
Arterial blood	159.537	0.200	1.257
Portal vein	168.257	0.170	1.009
Hepatic vein	79.848	0.077	0.964

Per centage of loss in arterial blood in its passage through the liver.. 23.309
Do. do. do. of portal vein..... 4.460

* * * * * * * *

Another link, then, is added to the chain of facts which make up the history of cholesterine. The first is, that

Cholesterine is formed in the brain and nervous system, and absorbed by the blood.

The second, which has just been proven, is, that

Cholesterine, formed in these situations, and absorbed by the blood, is separated from the blood in its passage through the liver.

The next question, in following out this line of inquiry, is, What becomes of the cholesterine which is separated from the blood? This question is very easily answered, and necessitates only an examination of one of the products of the liver—the bile."

In solving this problem, two separate and distinct functions are claimed for the bile:

"It seems to me that enough has been said with regard to the function of the bile to convince the reader that this complex fluid has two important elements which have two separate functions:

"First. *It contains the glycho-cholate and tauro-cholate of soda; which are not found in the blood, are manufactured in the liver, are discharged mainly at a certain stage of the digestive process, are destined to assist in some of the nutritive processes, are not discharged from the body, and, in fine, are products of secretion.*"

"Second. *It contains cholesterine; which is found in the blood, is merely separated from it by the liver, and not manufactured in this organ, is not destined to assist in any of the nutritive processes, but merely separated to be discharged from the body, and is a product of excretion.*

"These two propositions, and more especially the second, being established, it becomes our task now to follow out the cholesterine after it has been discharged from the liver into the small intestine. If it be discharged from the body, it must be by the rectum; and, to complete the history of cholesterine, we find it necessary to study the fæces."

Examining the fæces, then, both historically and experimentally, the author finds an excrement of great importance, heretofore called *seroline*, by the few French physiologists who have noticed it at all. To this substance he proposes to give the name STERCORINE, as indicating "its excrementitious properties, and the channel by which it is evacuated." Analyses of the decolorized fæces of an individual suffering from jaundice, and of fæces from the same patient after they had become normal, lead to the conclusion that this last substance is "*produced by a transformation*, connected with the digestive act, of the cholesterine of the bile." Hence the following propositions:

"1. *Cholesterine is an effete material, produced by the destructive assimilation of nervous matters, and absorbed by the blood.*

"2. *It is separated from the blood in its passage through the liver, enters into the composition of the bile, giving this fluid its excrementitious character.*

"3. *It is poured with the bile into the upper part of the small intestine, when the process of digestion induces a change into stercorine; in which form it is discharged by the fæces.*

"4. *Stercorine, the great excrementitious element of the fæces, is one of the most important excrements produced by the waste of the system.*"

The pathological importance of cholesterine is thus stated:

"*In simple cases of jaundice we have a resorption of the coloring matter of the bile from the excretory passages.*

"*In grave cases of jaundice, which almost invariably terminate fatally, we have a retention of the cholesterine in the blood, or cholesteremia.*"

And farther:

"Examination of the blood and fæces of the patient suffering under cholesteremia, with jaundice, thus leads to the following conclusions:

"1. *The cholesterine is enormously increased in the blood, showing that the structural change in the liver has interfered with its removal from that fluid.*

"2. *The stercorine is correspondingly diminished in the fæces, showing that the cholesterine is not discharged in normal quantity into the alimentary canal.*"

The following are the general conclusions at which the author arrives:

"1. Cholesterine exists in the bile, the blood, the nervous matter, the crystalline lens, and the meconium, but does not exist in the fæces in ordinary conditions. The quantity of cholesterine in the blood of the arm is from five to eight times more than the ordinary estimate.

"2. Cholesterine is formed, in great part if not entirely, in the substance of the nervous matter, where it exists in great abundance, from which it is taken up by the blood, and constitutes one of the most important of the effete or excrementitious products of the body. Its formation is constant, it always existing in the nervous matter and the circulating fluid.

"3. Cholesterine is separated from the blood by the liver, appears as a constant element of the bile, and is discharged into the alimentary canal. The history of this substance, in the circulating fluid and in the bile, marks it as a product destined to be gotten rid of by the system, or an excretion. It pre-exists in the blood, subserves no use-

ful purpose in the economy, is separated by the liver and not manufactured there, and, if this separation be interfered with, accumulates in the system, producing blood-poisoning.

"4. The bile has two separate and distinct functions dependent on the presence of two elements of an entirely different character. It has a function connected with nutrition. This is dependent on the presence of the glycho-cholate and tauro-cholate of soda, which do not pre-exist in the blood, subserve a useful purpose in the economy, and are not discharged from it, are manufactured in the liver and peculiar to the bile, do not accumulate in the blood when the function of the liver is interfered with, and are, in short, products of *secretion*. But it has another function connected with depuration, which is dependent on the presence of the cholesterine, which is an *excretion*. The flow of the bile is remittent, being much increased during the digestive act, but produced during the intervals of digestion, for the purpose of separating the cholesterine from the blood which is constantly receiving it.

"5. The ordinary normal fæces do not contain cholesterine, but contain *stercorine*, (formerly called seroline, from its being supposed to exist only in the serum of the blood,) produced by a transformation of the cholesterine of the bile during the digestive act.

"6. The change of cholesterine into stercorine does not take place when digestion is arrested, or before this process commences; consequently, stercorine is not found in the meconium, or in the fæces of hibernating animals during their torpid condition. These matters contain cholesterine in large abundance, which also sometimes appears in the fæces of animals after a prolonged fast. Stercorine is the form in which cholesterine is discharged from the body.

"7. The difference between the two varieties of jaundice with which we are familiar—the one characterized only by yellowness of the skin, and comparatively innocuous, while the other is attended with very grave symptoms, and is almost invariably fatal—is dependent upon the obstruction of the bile in the one case, and its suppression in the other. In the first instance, the bile is confined in the excretory passages, and its coloring matter is absorbed; while in the other, the cholesterine is retained in the blood, and acts as a poison.

"8. There is a condition of the blood dependent upon the accumulation of cholesterine which I have called *Cholesteremia*. This only occurs when there is structural change in the liver, which incapacitates it from performing its excretory functions. It is characterized by symptoms of a grave character, referable to the brain, and depend-

ent upon the poisonous effects of the retained cholesterine on this organ. It occurs with or without jaundice.

"9. Cholesteremia does not occur in every instance of structural disease of the liver. Enough of the liver must be destroyed to prevent the due elimination of the cholesterine. In cases in which the organ is but moderately affected, the sound portion is capable of performing the eliminating function of the whole.

"10. In cases of simple jaundice, when the fæces are decolorized and the bile is entirely shut off from the intestine, stercorine is not found in the evacuations; but in cases of jaundice with cholesteremia, the stercorine may be found, though always very much diminished in quantity; showing that there is an insufficiency in the separation of the cholesterine from the blood, though its excretion is not entirely suspended. After death, but a small quantity of bile is found in the gall-bladder."

The Italian Campaign of 1859—*Medico-Chirurgical Letters from General Head-Quarters.* By Dr. A. BERTHERAND, Principal Medical Officer of the First Class, etc., etc. Translated for the AMERICAN MEDICAL MONTHLY.

LETTER VIII.

SURGICAL RÉSUMÉ.

Flight of Conical Projectiles—Contusions—Extraction of Balls—Hæmorrhages—The Trephine—Amputations—Resections—Internal Injuries—Army Ambulances—Temporary Hospitals in Italy.

To DR. E. BERTHERAND:

My Dear Brother—The special object of my former letters has been to sketch the general aspect of our ambulances after each encounter, and that of the hospitals, in which I soon rejoined the wounded, and, at the same time, briefly to run over the striking features of the gunshot wounds which most attracted my notice in a clinic made of necessity *on the double-quick.*

To-day, on the eve of taking my departure from this field of observation, where there is still so much to be gleaned, I should leave, it seems to me, a much wider gap in my necessarily unfinished task, did I not recapitulate, in a few comprehensive summaries, the practical conclusions, which are the natural corollaries from so many facts, presented, until now, without method, and solely in the order of their chronological succession.

Occupied from 1854 till 1857 with the active ambulances of the

Army of Africa, I did not have the honor of sharing, with the great majority of my colleagues in the medical service, in the labors of the siege of Sebastopol, or in the experience, which so vast a theatre must have afforded, of the new conditions introduced into the surgery of camps, by the modern improvements in military pyrotechnics.

The Arabs and Berbers, with whom our troops have had to contend for the last twenty-nine years in Algeria, possess no artillery, and make little use of the bayonet or sword, in either attack or defence. The stone spheroids, with which their clumsy guns are loaded, are yet, and will, for a long time to come, be spherical balls. I have, therefore, during my long service under the tent, in Kabylia, as well as in the Atlas and Mitidja, had to treat only wounds made by this latter class of projectiles. Among the wounded of the enemy who have remained prisoners in our hands, I have, perhaps, had the opportunity of examining a dozen cases of wounds produced by the bursting of bombs from our own field-pieces, or the cylindrical bullets of our rifled carbines.

The new study to which I came to devote myself on the battle-fields of Italy had, therefore, all the charm of novelty for me; you would judge so from the following extracts from the documents which it has furnished me the opportunity for collecting.

Properly to account for the flight of conical projectiles, and their effect upon the tissues, we must not lose sight of the fact that they owe the characteristic attributes of their superiority, namely, *accuracy* and *length* of range, to the peculiar manner in which the impulse is applied to them. The efficient cause of these advantages is found in the grooved arrangement of the interior of the tube in which the explosion takes place. This is so essentially true that analogy and experience soon led our artillerists to adapt the system of grooving to their pieces.

The nature of the flight of the new balls—different from that of the old spherical balls, but also double—results: 1st. From an initial expulsive force which projects them in the direction of their longitudinal axis; 2d. From an impulse which causes them to turn upon themselves about this same axis; the final resultant is a *spiral* or *cork-screw* motion.

In order that the body thus impelled may maintain its rectilinear course, we have lightened its base by *hollowing* it out, so that the centre of gravity is brought nearer the anterior part of the cone. The tendency to oscillate at a certain distance from the point of discharge is thus prevented. The Austrians fulfill the same indication by means

of two or three grooves cut into the surface of the cylindrical end of the bullet. I have in my possession several cylindro-conical balls, extracted either by myself, or under my immediate observation, from regions where they had come in contact with osseous structures, and have discovered that, in the greater number of them, the cracks, cleavages, flattening, or other alteration of shape, are situated upon the summit or on the sides of the conical portion of these projectiles. I consider, then, until I am better informed, that penetration by the point is the rule, and by the base the exception. And, let me ask in passing, if this be not the case, what great advantage has our artillery gained in substituting the oblong and pointed form for the spheroid of the primitive bullet, with a view to increased efficiency in siege-firing?

This view of the flight of cylindro-conical balls authorizes me in regarding what has been said as to the greater average severity of the wounds which they make as compared with those produced by the round balls, as much too absolute. In support of my opinion, I shall cite gunshot wounds which affect the soft parts only. Is it not true that a sharp body should separate the fibrous layers more easily and pursue a more regular course with less violence and less havoc than an obtuse mass, even were the latter irreproachably spherical?

From the form and mode of penetration of the new projectiles, I should deduce, moreover, the following conclusions, which, I may say, have been confirmed by observation:

1st. The point of conical projectiles, striking the spongy portion of a bone, (an extremity,) has a better chance of penetrating without splintering; if, on the other hand, it is a compact portion (diaphysis) which is struck, the risks are that the fragments will be numerous and of large size.

2nd. The spiral motion of the conical cylinder affords less opportunity for reflection from resistant surfaces than do the form and conditions of motion of the spheroid.

3d. *A priori*, the orifice of penetration of a Nessler ball should be smaller. Apart from this difference, which has not often appeared to me to be perceptible, there is another of more importance—it produces less contusion around the opening. As far as their exit is concerned, the conditions are the same as for other balls; the disadvantage here inclines rather to the side of the new projectiles. The resistance which they have met in their passage through the tissues tends to cause them to deviate from their course, and when they reach the integument, to open a way of escape for themselves, instead of

perforating it with a sharp point, they often present the diameter of the base, or even that of the side, more or less oblique, but always increased.

Like round balls, they split against hard and sharp, or cutting, bony surfaces, with which they came in contact. A number of wounds figure on our notes, in which we were able to extract only portions of lead, equivalent to scarcely a quarter or a fifth of the entire ball. You may say, I know, that the fragmentation in these cases may very possibly have occurred outside of the body, and that the wound may have been caused by a ricochet. But—to resolve every doubt—I preserve most preciously a ball, cut into two nearly equal halves, from summit to base, by the crest of the left tibia, on which I found it clasped, about two fingers' breadths above a simple fracture of the bone. The two segments held together by only a very thin bridge of metal. A little greater force, and the section would have been completed.

The alterations in form, so varied and so curious, which the projectiles removed from wounds present, have led us to collect a number of them, which we have placed in the hands of the Surgeon-in-Chief, Baron Larrey, to be deposited in our name in the Museum of the Military School of Medicine of Val-de-Grace. Added to the already important collection furnished by the Surgical Corps of the Crimean Expedition, these specimens will familiarize our young comrades of the school better than any description, with appearances, a preparatory notion of which is so serviceable before encountering the difficulties and surprises attendant on the exploration of gunshot wounds.

Contusion, which is unquestionably the simplest of all wounds produced by fire-arms, is usually due to a projectile which has reached the extreme limit of its flight. We have also observed it, however, under other conditions; as, for instance, the passage of a ball over a soft, yielding surface, in a direction parallel to that surface—the weakening of the force of a blow by the resistance of the walls of a cavity, as of the abdomen—the interposition of an article of clothing, of equipment, or any object whatever, between the missile and the point of contact. A very curious example of this last class of accident was presented, after Solferino, by M. B., Chief of the Battalion of the 74th Regiment of the line. A ball had broken in two the scabbard of his sabre, on the outer side of the left leg, immediately against the crest of the tibia.

A careful examination of a considerable number of military contusions of the first and second category does not recall to me anything

especial with regard to conical balls. The ecchymosis, which is one of the most constant phenomena of contusions, assumes an individual character, in extent, deep discoloration, prominence, and sharpness of outline, when produced by a bullet or a fragment of a shell. I have had occasion to notice a number of sanguineous effusions, which in these respects resembled, almost deceptively, erectile discolorations of the skin, and which might readily have been taken for *nævi materni*.

When the contusion is situated upon the walls of a cavity, not only is the cutaneous ecchymotic discoloration sometimes absent, but this aspect of affairs, at first sight so favorable, may give way to symptoms of the internal rupture of vessels or viscera, and result in sudden death, all the more startling from the fact that ignorance of concealed injuries has not permitted us to form a prognosis.

The extraction of conical balls has seemed to me, if not always, at least very often, to offer obstacles relatively greater than that of the round. If you wish to remove them by the orifice of penetration, you find that the foreign body has changed its direction, in virtue of its own motion, of inflammation, or of the action of the teeth of your forceps. If you endeavor to find it by a counter-opening, the same considerations render it necessary to give greater extent to the incisions.

The cases of wounds of arteries observed among our men rise to quite an unusual proportion, if I refer to authors who have treated of the wounds of warfare, and to my own recollections of another theatre of military surgery.

To the cases of Commandant De L., who died of hæmorrhage at the division hospital at Alexandria, on the 29th of May; of Lieutenant P., of the Zouaves of the Guard, seen at *San Martino* after Magenta; of the officer in whom Dr. Leroy ligated the brachial at Castiglione, I ought to add, also, (to confine myself to instances which occurred under my own eyes,) that of Captain O., of the Algerian Sharpshooters. This unfortunate officer, whose forearm was pierced by a ball at its upper third, between the bones, was subsequently seized with a loss of red blood, which was attributed to injury to the interosseous artery. After vain efforts to control it by the application of Sognoroni's compressor, the usual hæmostatics, immediate and distant compression, it became necessary to tie the brachial. Notwithstanding this resort, which was supposed to be final, the hæmorrhage soon returned. Being on my way to Brescia on the 14th of July, I was requested to see the case. He was lodged with a worthy *confrère* of the city, who had tended his pillow, day and night, his

wife and two daughters relieving him from hour to hour, as occasion demanded, in order to maintain digital compression on the injured limb. After assuring myself of the reality of the ligation of the principal trunk, I probed the wound, and removed with my forceps a fragment of lead of the shape and size of a lentil, somewhat flattened. I then passed a tent, soaked with the solution of perchloride of iron, into the track of the ball. The blood ceased flowing. It occurred to me that the lower extremity of the arteriole might have been the source of the difficulty; I therefore advised the application of a glove bandage and compresses, methodically graduated, over the anterior surface, as well as in the interosseus space of the limb, up to the level of the wound, the hand elevated, perfect quiet, and digital compression in the hollow of the axilla. Despite these precautions, the dressing, the second day after, became tinged with red blood, and the patient becoming weakened, it became inevitable, all resources having been exhausted, to resort to the cruel necessity of amputation. I have since learned that Captain O. sank under its exhausting sequel.

The persistence of the hæmorrhage in this very unusual case, after the ligation of the arterial trunk, and in spite of all the precautions for avoiding the return of the blood by the distal extremity of the divided vessel, cannot be attributed, in my opinion, to anything but an anomaly in the origin of the interosseous artery. May it not, for instance, have arisen directly from the brachial above the point ligated—or even from the axillary, as is sometimes observed in the collateral and terminal branches of the principal artery of the superior extremity? It is certainly to be regretted that no attempt was made, by nescroscopic examination, to find the solution of a problem of military surgery, so difficult, and fortunately so rare.

At Monte Chiaro, one of my Assistant-Majors, M. Gaujot, who had charge of a temporary hospital, in which the Austrian prisoners of Solferino predominated, performed or witnessed fifty-three grave amputations. He has returned, struck with the great mortality among the cases operated on, in consequence of secondary hæmorrhage. We await from our young colleague and his *confrères*, who were witnesses of these fatal terminations, circumstantial information with regard to a complication to which our nomadic service in the active ambulance has not left us leisure to devote a proper degree of attention.

The wounds of the chest healed, or on the way to ultimate cure, which have been mentioned in the course of this correspondence, are not the only ones which have fallen under our notice. Assistant

Surgeon-Major Miche possesses a very beautiful example, which I have strenuously urged him to publish.

The operation of trephining, which the works of Gama and Baudens have so greatly contributed to bring into disrepute with the rising generation of army surgeons, has been performed, as far as I know, but a small number of times. I can only cite four instances of its application at the hospitals at Brescia, by my learned colleague and friend, Doctor Isnard. Three of the patients were saved, the fourth died.

It would be difficult for me to say, even approximatively, what has been the whole number of amputations of all kinds following our sanguinary engagements; what the proportion of amputations in continuity relatively to disarticulations and resections; what the proportion of amputations to resection, or finally of successes to failures.

In the active ambulances, one circumstance entirely out of the reach of our surgical skill, and which, nevertheless, from the outset of the campaign, received all our attention—I refer to the absence of instruments for special operations in our caissons—often prevented us from removing fragments from an articular extremity, which did not involve the body of the bone beyond the epiphysis. The resection-cases did not arrive at the General Head-Quarters until the 2nd of July, at Valeggio, a whole week after the terrible day of Solferino. If I refer with particularity to this fact, it is simply that it may not be inferred from the insignificant number of resections attempted on the battle-fields of Italy that we voluntarily discarded a class of operations in which, for my own part, I met with such marked success in Algeria.

In the absence of accurate and full figures on the general results—as to wounds, general mortality, and that attending the capital mutilations—here are a few partial estimates which may serve to anticipate the general report, and to support the presumption of satisfactory final averages. One of them refers to the most pitiless of all amputations, that of the thigh. On the 9th of August last, out of ten operations at *San Filippo*, M. Gherini and his colleagues could count seven successful ones. After Solferino, more than 17,000 French, 14,000 Italians, and about 1,500 Austrians (say 33,000 wounded or sick) entered the hospitals of Brescia; fourteen consecutive amputations were performed. From the 6th of June until the present time, a period embracing the actions of Magenta, Melegnano, and Solferino, Milan received in round numbers, 21,000 French, 6,000 Italians, and 7,000 Austrians; total, 34,000 wounded or fever patients. Of these, 29,000 have left cured, or been transferred as convalescent to other places;

4,000 are still under treatment. The mortality has not risen above 1,400 individuals, a proportion of less than 4 to 100!

In these hurried notes, I cannot give much space to internal affections. The physicians of the hospitals of Alexandria and Turin, of Genoa and Marseilles, at a distance from the accidents of the war, and more especially charged with the treatment of those patients whom fatigue or physical disability always draw off from the army in great numbers just before or after the first encounters, cannot fail soon to afford us the facts on this subject from the statistics which they are patiently collecting.

But I may be permitted to say, unofficially, even at this early date, that during the entire course of this glorious campaign, which has been so rapidly brought to a close, the Army of Italy, the effective force of which reached the number of 218,000 men, has never counted more than a very limited minority of unserviceables from such causes.

And when one thinks of the unfavorable circumstances under which it was necessarily formed, brought together by forced marches, or transported across the sea at a moment's notice, from the southernmost cantonments of Algeria, and the garrisons of the metropolis, in the North, this becomes almost wonderful. It is true that, during the last few days, the appearance of certain febrile or intestinal affections in the divisions encamped in the neighborhood of Pavia and Plaisance, has been announced. But this is undoubtedly the effect of the at present excessively high temperature which scorches the plains of Lombardy. The counsels of hygiene must be heeded. To the monotony of the halt, which is dragged out under the heat of the sun, and the burden of arms, rations, and munitions, have succeeded the day passed listlessly in the tent, and the night without excitement or anticipated alarm; the night of *slumber*, that indispensable restorative of the body, which might be said to have been unknown, even despised, by our soldiers on the campaign, as though to sleep were repugnant to the impatience of their passionate energy. Already, here at Milan, the entries into the hospitals have begun to decrease very sensibly; combining transfers and discharges, the entire number of sick and wounded exhibits a diminution of more than a fifth, as compared with the first part of the month. We have been able to restore to their original objects the spacious buildings of the *San Francesco* barracks, and anticipate the speedy closing of several of the temporary hospitals: the *Lieux-Pies*, the *Boys' Orphan Asylum*, the *Grand Séminaire*, and several others whose names escape me; they are so numer-

ous that I have never been able to impress them all upon my memory!

The laudable desire of doing something for the relief of our brave soldiers, suffering from their wounds, the necessity of bringing to bear both the kindly emotions of the heart and the ingenuity of the brain, upon the labors and misfortunes which glory inevitably draws in her train, has led many of our brethren in France to address to us propositions, interesting in many respects, on the subject of improvements in the treatment of gunshot wounds. Both time and opportunity have, in most cases, been wanting to carry out our intention of experimenting on these new and ingenious methods, and we can only mention here with gratitude suggestions, on the merits of which we should not feel ourselves at present competent to pronounce understandingly. For example, the unique apparatus of our skillful colleague, Prof. Gaillard, of Poictiers, for all fractures of the inferior extremity—an apparatus whose simplicity and ease of inspection naturally find their indication in the busy and crowded hours which immediately follow great battles—the method of retaining the same class of fractures by means of plaster moulds, recommended to the notice of the Surgeon-in-Chief, Baron H. Larrey, by Dr. Giron, of Buzaringues, —the *sachets of charpie*, and *compresses of carboniferous paper*, extolled by MM. Pichot and Malapert, the humble forerunners of MM. Corne and Demeaux, in the famous, but still incomplete attempt to procure the absorption of pus, and the disinfection of suppurating surfaces—the *occlusory compressors* of Dr. Jules Seguin, for penetrating wounds of the chest, etc., etc.

The genius of Percy and Larrey during the wars of the Republic and the first Empire raised our ambulance system at a single stride to a degree of perfection which long made us the envy of all the military powers of Europe. For nearly thirty years of Algerian expeditions, it has been gradually adapted to the necessities of an essentially rapid and active strategy over a difficult country. Finally, having been greatly improved in the Crimea, the modifications in its *matériel*, which had resulted from a long and varied course of practical instruction, have been subjected to the test of the Italian Campaign.

For my own part, I cannot but approve the substitution of a single hanging caisson, for the multiplied models of vehicles which formerly constituted the *light caisson*, the *magazine-caisson*, and the *caisson* properly so called. The service has, in this particular, gained both uniformity and simplicity. The new caisson, with movable fore-car-

riage, when delivered of its contents, is transformed into a more manageable vehicle, and a less painful means of transport for the wounded.

I have no doubt that my colleagues in the army will have noticed, in their general reports, certain alterations to be made in its internal arrangements. To reproduce here, *in extenso*, the criticisms of details which have been suggested to me by the study of our rolling stock, would be an irksome, and, at present, a barren task. It will be more profitable, we believe, to reserve these observations for the time when the Ministry of War, always solicitous for the progress of its ambulant hospital system, shall think fit to call a council of the whole; our contribution shall then not be wanting. The useless breaking up of our surgical arsenal into a number of boxes in which the same instruments are unnecessarily repeated; the absence of certain instruments for prehension, appropriate to those operations in which the seizure of the shattered ends of bones with the fingers is so difficult, and sometimes so dangerous; the possibility of comprehending, in a single case, like that which is used in the marine service, these scattered instruments which are hereafter to be simplified, assorted, and completed, with a special view to ambulance practice; the exclusion, or at least reduction in the number of regimental knapsacks, bags, and canteens; of instrumental apparatus, which uselessly and burdensomely occupy the place of materials for dressing which are much more needed; conveniences for augmenting the always inadequate supply of nurses on field-duty—such are the principal points to which we should call especial attention.

I shall tell you nothing that you do not already know with regard to the installation of our wounded in the Piedmontese and Lombard hospitals. The French military authorities, in confiding their delicate mission to the hospital establishments of our allies, so well supplied with every resource, did not yield to considerations of economy or of personal convenience alone. Acting with the entire and intelligent approbation of the Surgeon-in-Chief, they showed a true practical understanding of the necessities which, born of the occasion, sprang up around them on all sides. In the precipitate haste which had whirled 200,000 men at railroad speed between the Alps and the Apennines, would it not have been both foolish and dangerous to have passed contemptuously by institutions ready prepared, for the sake of plunging into superhuman and probably useless efforts to form an organization, the least misfortune of which would have been, that it would certainly have been perfected too late to be of service? One fact, out of a hundred, will convince the most incredulous of the im-

possibilities of a course which they persist in regretting was not followed. Lombardy and Piedmont furnished 280 assistant surgeons to the hospitals of Milan alone—from the 6th of June to the end of August, 1859. How could we have spared from our active ambulances, the greater part of which were reduced to a third, or even a quarter of their ordinary force, this phalanx of subaltern practitioners, who are even now lacking to our hospitals in France, and whose absence would have been most painfully felt by those who, the day after a battle, beg for a simple dressing of their wounds, bought by the blood they have so generously poured out?

Committed, from the first, to a measure so wisely adopted, I obtained for my French colleagues the service of medical inspection of the Italian hospitals, opened to our soldiers. I saw in this arrangement a common sharing at the same time of incentive and of responsibility; an effective bond of union between the efforts of the two systems of surgery, French and Italian, blended, like the two nationalities, in a grand work of devotion; the one on the theatre of glory, the other on the common ground of suffering and of consolation. I purposely re-echoed myself the irritability and captiousness of suffering far from home and family. I have reread with care the terms in which my pen has written down my well-considered opinion on this matter—is it possible to discover in it the least indication of want of confidence or mistrust of my honored colleagues of Piedmont and Lombardy? I call them to witness—has not this common participation in the treatment of the wounded resulted, on the whole, to the advantage of personal friendships, to the good of the service, and the welfare of the patients?

Clinical teachers of long standing in the branches which are so justly esteemed in the Italian universities, our civil *confrères* of Brescia and Milan, have, in more than one grave or obscure case, happily sought the authoritative, but always courteous, advice of our French military surgery, so worthily represented in the persons of MM. Isnard and Cuvellier. These reports of each day's occurrences recall to our memories, though all too indistinctly, no other souvenirs than those of a mutually congenial fellowship, forever engraven upon our hearts, and henceforth inseparable from the grand events which gave it birth! Your devoted brother.

MILAN, *August* 17, 1859.

LETTER IX.

The Lake of Como—Turin—Mont Cenis—The Hospitals of Cremona—Parallel between Primitive and Consecutive Operations—Sphacelus of Stumps—Tetanus—Hæmorrhage—Hospital Gangrene—Purulent Infection—Amputation in Fractures of the Femur.

To Dr. Billon:

My Dear Friend—It is now scarce two days since I recrossed the frontier, and here I am at work, putting down for your benefit my last impressions of our glorious tour through this beautiful Italy, already left too far behind us.

If my remembrance reaches you a little late, it is not because I have not dwelt often upon our old friendship, but for lack of time to write to you. Have I not had constantly on my horizon the summits of the Alps, now gray, now rosy, and now white,—majestic reminders of our walks of other days, over the passes of the Vosges, in the Black Forest, and even up the toilsome peaks of Switzerland? At Dezenzano, when, seated on the rampart of the gate, my eye lost itself in the mountainous defile, where the northern point of the stormy Lake of Guardo lies hidden,

"Fluctibus et fremiter assurgens,"—(Virg.)

it always seemed to me as though I could see, rounding the steep crag of *Fluelen*, on the *Lake of the Four Cantons*, the steamer, on board of which we jumped at Weggis, on our return from the Righi.

And, if I descend, my dear friend, from the enthusiasm and ecstasy of the tourist to professional realities; could I, while studying, day by day, the hospitals, the physicians, and the diseases of Italy, omit a third reminiscence, including these same objects of investigation, which once led us together to London, to the clinics of Lawrence and Sir James Clark, and the museums of St. Thomas's, St. Bartholemew's and Guy's Hospital?

In penning you these lines to-day, it is not my intention simply to tell you by what route, more or less indirect, my roving humor has led me to trace out a path from Milan to Paris, by way of Como, Genoa, Turin, and Mount Cenis.

But as I journeyed, I have got possession, either myself or by letter, of new documents bearing on our medico-chirurgical campaign, and I owe my friendly correspondents an acknowledgment of the receipt of the learned communications which they have been good enough to send me.

Like all the cities of Italy, Como asserted its right to a share in

the hospitable reception of the wounded of Solferino. It was but justice to this brave and intelligent city, one of the first of central Italy, to hoist the flag of independence. It has been an immense advantage to more than fifteen hundred sick or wounded men, whose convalescence has thus been permitted to profit by a sojourn in so delightful and healthful a spot.

Como owes to the immense sheet of water which bathes it on all sides, a softness and uniformity of temperature, which must be felt to be appreciated. Its drinking water comes down from the grand upper reservoirs of the Alps—not, as one might readily suppose, at first sight, from the subterranean drainage of the lake—and is well provided with salts.

At the time of my crossing into the region of Volta, its four principal hospitals and a large number of private houses contained about a thousand convalescents, intrusted to the medical care of the native practitioners under the intelligent supervision of Surgeon-Major Petit-Gand, assisted by Assistant-Surgeon Major Breese. Under the shade of a neighboring villa, Col. B., of the First Zouaves, whose remarkable wound in the head of the humerus, received at Solferino, we have already related, is pursuing the re-establishment of his health, terribly shattered by the consequences of so severe an injury.

The steamboat bell which sounds the hour of departure for Bellagio with a punctuality which leaves nothing to hope for, scarcely permits us to glance at the motley architecture of the cathedral, half Roman, half Gothic, its ancient paintings and the frescoes of its chapels; at the old tower of the *Broletto*, and the antique marble colonnade of the Lyceum,—for the lake awaits us with its gardens and villas, its gondolas and cascades. Here the outline of a little theatre reveals to the curious traveler the retreat of Madame Pasta; there stands the picturesque market-town of Torno, which you would say was built upon a raft; on the opposite side lie Torsiglia, Argegno, and the laurel thickets of Brienno. Farther along on our right opens a sort of bay, at head of which *Pliniana* commemorates the discovery made upon this spot by the celebrated Latin naturalist of an intermittent spring. At Como, Pliny, interpreting one of Nature's most whimsical freaks; at Sermione, on the lake of Guardo, the ruins of the house and gardens in which Catullus used to delight; the heights of Volta, the distant outline of Mantua, the loved home, if not the cradle, of Virgil—what an unlooked-for retrospect of classic memories the wanderings of the war had in store for us!

Shores more and more smiling glide by before our eyes as we pro-

ceed. We almost touch the promonotory of Bellagio, which constitutes the division line between the two lower branches of the Lake of Como and the limit of our projected excursion. On our right, the chisels of Canova and Thorwalsden have adorned the *Villa Sommariva*, embellished by many of the works of the great masters, but rich above all in that vigorous growth of olives and cedars which has gained for *Tremezzina* so just a reputation. From the summit of the rocky steeps, behind which Bellagio is sheltered, the eye embraces the most magnificent panorama. But it seems, my friend, that instead of a letter, I am in a fair way to compose a *guide-book*. I hasten, then, to transport you to Como, not, however, without having given a few brief moments to the *Melzi* palace, its exquisite paintings, and its busts and statues by Comolli.

On the 20th of August, forty-eight hours after leaving Milan, I again reached Genoa, to attend to some little details of business, and the next day my traveling orders directed me to Turin. The learned Professor Riberi was confined to his bed, when I called upon him, at different times, and I was compelled, with much regret, to give up the honor of paying my respects to the illustrious Nestor of Piedmontese surgery.

My short stay at Turin gave me too little leisure to allow of my visiting its objects of interest. I am, therefore, unable to entertain you with them at any length. I owe, however, a special mention to the University, with its immense library, its cabinets of medals of anatomy, of Natural History, and of antiquities, among which we notice a truly remarkable collection of Egyptian relics. Turin possesses a number of spacious, well-arranged hospitals, which were extensively used for transfers during the campaign. At the opening of the war, we had organized a French hospital in the buildings of an infantry-barrack, the internal arrangements of which seemed to me far inferior to the improvised establishments of Milan and Brescia.

On the 24th I jumped on board of one of the trains of the railway, which will, in a few years, pierce the base of the Alps, and subterraneously unite Italy and France. Meanwhile, the locomotive stops at Susa, and a heavy carriage, drawn by five pair of mules, is charged with the duty of hoisting us, *piano et sano*, to the summit of the pass of Mount Cenis, 6,780 feet above the level of the sea. Shortly before arriving at this culminating point, the traveler crosses the *plateau* of the mountain, properly so called, where are noticed the Hospice, the Inn of the "Grand Cross," and the Lake, abounding in fish, we were told, whence the Cenise, one of the tributaries of the Little Doire,

takes its rise. Descending from the summit of Mount Cenis, on the east, to Lanslebourg, Lesillon, and Modane, the road runs for nearly the entire distance alongside of the rapid and noisy torrent of the *Arc*. From Modane to St. Jean de Maurienne, the descent becomes less and less steep, until we arrive at last in the centre of the valley, the first hereditary domain of the modern House of Savoy. The sombre and desolate aspect of this region is still further saddened by the presence of a miserable population, constantly deteriorating under the hardships of a laborious life upon a barren soil, and the baleful endemics of goître and cretinism.

You understand from this picture, my dear friend, that there is nothing here to detain the traveler who is separated by only thirty-six hours of cars, from the end of his journey, PARIS.

I had left too many subjects for study and investigation, in Italy, not to have taken precautions for continuing them by means of letter before my departure. Several of the documents which have been forwarded to me in consequence of these arrangements complete the surgical portion of this narrative in so interesting a manner that I cannot resist the temptation to close my correspondence with a few extracts from the letters of Surgeon-Major Sourier, of the 1st Class, 68th Line, and Assistant Surgeon-Major Lhonneur, of the General Head-Quarters, both employed in the hospitals of Cremona. Packed into every available conveyance that could be obtained in the city or its environs, the wounded of Solferino were hurried on to Cremona the day after the battle, suffocated by the heat and dust, and bruised by the jolting of the journey. In the course of a few days, ten thousand patients had been distributed among its hospitals, its convents, and its churches. In the laborious duty of ministering to so many sufferers, three important institutions fell to the lot of our learned fellow-laborer, Dr. Sourier—*Santa Chiara*, *Benedetto*, and *Corpus Domini*, in all containing 2,452 wounded, among whom were sixty-six cases requiring amputation, not to mention the ligation of several arteries, the extraction of numerous sequestra, etc. Among these transfers, there figured, besides, ten cases in which amputation had been performed before they were sent away, five wounds of the chest, and three of the bladder; none of the abdomen, doubtless, for the simple reason that the rapidity with which the fatal termination arrived prevented them from reaching Cremona.

M. Sourier recapitulates, as follows, with regard to nationality, the nature of the mutilation, and the final issue; the results furnished

by the sixty-six capital operations which he had the opportunity of witnessing:

		Recovered.	*Died.*	
French.	Leg,	8	9	17 Recoveries. 15 Deaths.
	Thigh,	2	6	
	Finger,	1	6	
	Arm,	4	6	
	Shoulder,	2	6	
Austrians.	Leg,	11	10	14 Recoveries. 20 Deaths.
	Thigh,	3	8	
	Arm,	3	1	
	Shoulder,	3	1	

This excess in the comparative mortality, on the part of the Austrians, is to be explained by two causes: our artillery (rifled cannon) produced injuries more severe than did theirs; and, on the other hand, we must take into account the physical and mental condition of men picked up for the most part from the field of battle, where they had been abandoned by their friends.

The ten operations performed on the spot at Solferino gave nine recoveries; an eloquent result in favor of immediate amputation.

In order to show in a still more striking manner how the chances of success, after capital mutilations, diminish in direct ratio with the time which elapses between the reception of the wound and operative interference, "I have arranged," adds our correspondent, "the cases which have been received after amputation, or on which it has been performed in my service, by successive series of fifteen days, and have recorded in this way:

	Operations.		Successful.	Unsuccessful.
From June 24 to July 31,	17,	(4 capital,)	12	5
" July 1 to " 15,	30,	(11 ")	14	16
" " 15 to " 31,	14,	(7 ")	2	12
" Aug. 1 to Aug. 20,	5,	(2 ")	3	2
			31	35

"These figures speak louder than any argument."

The accidents which carried off those who had been operated upon at Cremona manifested themselves in the following order: sphacelus of the flaps—tetanus—hæmorrhage—conicity of the stump—hospital gangrene—purulent infection. I feel it my duty to cite M. Sourier *verbatim* on this point.

I. "*Sphacelus of the flaps*, which was rare in primitive amputations, did not ordinarily appear until two or three days after the removal of the limb—generally the leg—in front, and on that part of

the surface of the skin which corresponds to the crest of the tibia. The fall of the eschar left the bone naked. Fortunately, this region, being vascular and full of vitality, granulates readily, and nearly always succeeds in forming, with the aid of the surrounding tegumentary flaps, a solid cicatrix. It must not be supposed that this partial gangrene depended exclusively upon insufficiency of the integument or of nutrient vessels, imprudently sacrificed in the course of the operation. Its cause was to be attributed much oftener, in our opinion, to general and local conditions: to mechanical attrition of the parts in traveling; to the general nervous prostration and the depressed vitality of the part; to a morbid saturation with putrefying matter, operating here, as the urine does in wounds of the penis and perineum. We may farther speak of anæmia, and perhaps a predisposition, dependent upon the individual constitution. . . .

"This complication occurred so frequently, (25 times,) that, attributing it also, to some extent, to the operative method employed, we substituted, in the later cases, for the classical circular amputation at the place of election, Professor Sedillot's procedure with the external flap. This modification was followed by excellent results.

II. "Five cases of tetanus made their appearance, three or four days after amputation of the leg, and all during the first two weeks of July; at which time, the traumatic irritation still exerted its full effects. The disease did not generally commence abruptly, with the formidable symptoms which so often characterize it. The trismus gradually attacked and impeded the movements of the lower jaw. Deglutition remained quite easy; there was little rigidity of the trunk or limbs.

"Whether because the acetate of morphia, administered for twelve days, had fettered the development of the disease, or because the disturbance of the system, produced by the loss of a limb, had induced a morbid condition of the absorbents, it is a fact that three of our tetanic cases lived fourteen days. . . . ."

Like M. Gherini at Milan, like ourselves and many of our colleagues in Algeria, M. Sourier, in imitation of Larrey—who, we may say, in passing, never *advised* amputation as a cure for tetanus—removed a fractured leg in which the tetanic complication seemed to have its seat. As has been observed in other cases, however, the affection continued its fatal course, not the less surely.

III. Hæmorrhage, which was an unknown occurrence among the amputations of Solferino, appeared at Cremona early in July, and continued, in an increasing progression commensurate with the time

which had elapsed after the 24th of June. Including that from both arterial and venous sources, it appeared seventeen times, either during or immediately after the operation, or at some subsequent time—and by preference, in debilitated and anæmic subjects. We can understand, morever, how the action of the patient in bracing himself against the pain, or it may be the influence of the chloroform in arresting in the lungs the blood which accumulates in the right ventricle, renders the occurrence of syncope so much the easier when anæsthesia has deprived him of the resource of keeping up the circulatory movement by means of deep inspirations. "We may add," says M. Sourier, "that the inflammation developed an extraordinarily vascular condition of the traumatic regions, and evidently favored the afflux of blood to them. In general, the amputations which were preceded or followed by uncontrollable hæmorrhages resulted badly. Twice, under analogous circumstances, I ligated the femoral artery."

IV. "*Conical stump* occurred at Cremona, as an accident of the second period of the operations, "attacking about the eighth day those whose thighs had been amputated by the circular method, but in no instance those in whom the anterior flap method had been employed. In six of the cases noted, four resections of from two to three inches of necrosed bone were performed, but without success. The tissue, soon absorbed by suppuration, or by a peculiar process of mummification, again permitted the femur to project; but when once the inflammatory process had thrown out a disc of dead bone, the case got well."

I owe to the kindness of M. Lhonneur the details of the case of M. B., of the 4th Regiment of native sharpshooters, whose right thigh I amputated at Castiglione, after Solferino. The flap, which did not unite by first intention, having been separated by a large abscess, the femur pierced the skin, which had ulcerated by suppurative inflammation. Notwithstanding that there was a projection of four-fifths of an inch of bone denuded of periosteum, such strong adhesions had been formed posteriorly, that the denuded portion was immovably fixed. It is a question whether to await the tardy separation of this necrosed disc, which will probably be very tedious, or to perform at once a resection, which will shape up the stump, diminish the tendency to retraction, and subsequently facilitate the application of an artificial limb.

In my opinion, there is nothing to do but to await spontaneous separation, for experience has convinced me of the danger of reamputations. Moreover, the inconvenience of central adherent cicatrices, in

respect to the application of an apparatus to the stump, is greatly exaggerated, inasmuch as it, in point of fact, derives its firmest support from the pelvis, and not from the truncated extremity of the femur.

M. Sourier mentions but two cases of *hospital gangrene;* the first, having taken on the *ulcerative* process, had eaten out the entire cicatrix, (amputation of the arm?) and all the pectoral muscles; the second assumed the *pulpy* form, with false membranes and sanious suppuration, but without destruction of the tissues. The patients were pale and anæmic, and suffered from gastro-intestinal derangement, with flabby tongue, loss of appetite, &c. The hot iron, and injections of iodine locally, with quinia and iron-by-hydrogen internally, aided by careful and frequent dressing, saved one of them.

VI. "*Purulent infection,*" says M. Sourier, "is the most common, indeed, I might say, taking an enlarged view, the *single* complication of wounds where immense bodies of men are brought together under surgical treatment. If we consider the fact that the inter-current phenomena, which we have just mentioned, attack exclusively those on whom amputation has been performed, poisoned with their own morbid secretions, and saturated with the emanations of the hospital—if we take into account the persistence with which they reproduce themselves, under various forms, even when such accidents as hæmorrhage, retraction, etc., to which their occurrence had been attributed, have been subdued—how can we fail to see in this pathogenic system, the varying manifestations of an infection general, but identical—of an economy poisoned at the very springs of life?

VII. All great surgeons have been unanimous in recommending immediate amputation in badly comminuted fractures of the inferior extremity, and especially of the thigh. I have taken my exceptions to this precept in a former letter, on the authority of a considerable number of cases of preservation of the limb, observed during the campaign. This capital question of military surgery has elicited the following judicious reflections from M. Sourier:

"When called upon to make up one's mind on such serious questions, it is my opinion," says he, "that it is impossible to inquire too carefully into the nature and extent of the injuries, or to note too precisely the length of time which has elapsed since the reception of the wound. If you have a comminuted fracture, with adherent splinters, containing no foreign bodies, and without very extensive laceration of the soft parts—if the suppuration be moderate in quantity, and laudable in character, and occasions neither chill nor diarrhœa, nor symptoms of absorption—if your patient, otherwise sound and healthy, ap-

pears of a cheerful temperament; if the local and climatic influences in which he is placed are propitious,—wait! You may, perhaps, obtain a solid union of the bones.

"If, on the contrary, the fracture is of considerable extent and multiple, with splinters, projectiles, wads, etc., driven deep into the flesh —if the patient is feverish and excited—if the wound is discharging a suspicious and fœtid pus,—amputate without delay, for each day, each hour lost, is so much on the road to a cruel result. To defer is to invite suppuration, hæmorrhage, tetanus, hospital gangrene, or purulent infection; terrible threats, which are constantly hanging over the life of your patient!

"Hesitation, in these circumstances, is death!

"VIII. Twice has the *coxo-femoral disarticulation* seemed to us to be indicated. But, knowing the ill success which, with few exceptions, invariably attended this most serious mutilation in Algeria, in the Crimea, and lastly, in Italy itself, it was with the greatest difficulty that we could bring ourselves to decide upon its performance.

"On the thirty-second day in one case, and the fifty-sixth in the other, the steady progress of an irremediable disease decided us to amputate below the lesser trochanter, notwithstanding the discouraging statistics of the Hôtel des Invalides. The first case recovered; the second died of consecutive hæmorrhage two months after the operation."

We lose more individuals than we save limbs, said Dupuytren. Too often does the surgeon hesitate, disarmed by the consideration of the social position, the age, the shattered hopes of his patient, and see him die with four limbs when he might have lived with three. Certainly, when it comes to cutting off a thigh, it becomes a matter of conscience to calculate, as to the question of expediency, the adverse chances of so serious a mutilation. Still, there is no doubt in my mind that the sixty-three united fractures of the femur, collected at the *Invalides* by M. Hutin, the observations recently made at Milan, the cures which M. Sourier has observed, and our own personal appearance demonstrate, above all cavil, that such fractures, even when comminuted, may be redeemed from the stern sentence of the knife. But who can say that this success, numerically so insignificant, when compared with the grand total of fractures of the thigh by fire-arms, has not been bought at the price of the most lamentable sacrifices?

"I cannot think without feelings of the deepest sadness," exclaims Dr. Sourier, in conclusion, "of a little ward at Cremona assigned to severely wounded Austrians. At such moments, I see those wan, cadaverous faces rise up before me, blanched by exhaustion and a long

continuance of purulent absorption, as they implored by signs accompanied by piercing cries, the removal of a limb which we had wished to save, as a last favor to put an end to the pitiable agonies which we were compelled to witness without the power to relieve."

The lessons of this war will determine, it is to be hoped, the important surgical problems which I have simply skimmed over in these hastily written letters. Both science and humanity demand of a weightier pen than mine a service which, in itself, would suffice to render famous the already illustrious name of the Medical Inspector of the Army of Italy.

Yours very cordially.

PARIS, *August 30th*, 1859.

REVIEWS AND BIBLIOGRAPHY.

The Institutes of Medicine. By MARTYN PAINE, A.M., M.D., LL.D., Professor of the Institutes of Medicine and Materia Medica in the University of the City of New York; Corresponding Member of the Royal Verein für Heilkunde in Preussen; Corresponding Member of the Royal Medico-Chirurgical Academy of Turin; Corresponding Member of the Gesellschaft für Natur und Heilkunde zu Dresden; Member of the Medical Society of Leipsic; of the Medical Society of Sweden; of the Montreal Natural History Society; and of many other Learned Societies. "All are but Parts of One stupendous Whole; whose body Nature is, and God the soul."—POPE. "Theory is only common sense applied to calculation."—LA PLACE. Seventh Edition. New York: Harper & Brothers. With Notes. September, 1862. 8vo. Pp. 1,130.

This work has been before the profession since 1847. A *towering monument*, as it is, of laborious investigation, vast erudition, and profound reflection, we may well take for granted that it is known to the majority of our readers. Having written a somewhat lengthy notice of one of the earlier editions, we intend on this occasion to take only a bird's-eye view, as it were, of its general outlines.

The Institutes of Medicine are natural inductions of principles and laws from the healthy and morbid phenomena of living [human] beings. They are based upon Solidism and Vitalism. All systems founded on other considerations are spurious, unsatisfactory, and unstable.

To show the consistency of the Institutes of Medicine in all their

parts; to examine progressively the fundamental facts in physiology, pathology, and therapeutics; to develop and weave into a system the great principles and laws of organic beings; and to convert the system to practical uses in the preservation of health, and a just, intelligible, and philosophical application of the Materia Medica to morbid states of the body,—is the herculean task which our author proposes to himself. He has adopted an analytical method of discussion, and an arrangement which exhibits the natural relations of the subject in their just order. The object he has kept constantly in view evidently is clearly to represent, completely and comprehensively, the *Philosophy* of Medicine.

In his preliminary remarks he shows that "The immediate objects of physiology are a critical analysis of the vital conditions and results of organic beings, as manifested in different organs, and in their relations to each other. It contemplates organic nature, therefore, in its natural state; and the laws which it obeys are its highest end. Pathology is to the physician the great final object of physiology. It investigates the causes which disturb the physiological conditions, and inquires into the phenomena, and the nature of the vital and structural changes. These, in connection, form the ground-work of Therapeutics, which considers the indications to be fulfilled, and the means and the manner by which they are to be accomplished, and nature thus aided in the process of cure. The Materia Medica comes last, and is the subordinate object of all the rest. It investigates the composition and physical character of the material objects by which the therapeutical intentions are fulfilled, and interrogates especially their relations, as vital and alterative agents, to pathological conditions."

"It will be seen, in our inquiries into the great fundamental points, that the science of medicine is, throughout, a perfectly connected chain; beginning with the laws which govern the modes in which the elements of matter are combined in organic beings,—advancing to the union of organic compounds into cells and tissues,—to the laws which respect the various processes which are conducted by these tissues, and by the organs into which they are combined,—to those laws as affected by the contingencies of disease,—and, lastly, to the laws which regulate the changes through which the morbid states return to the natural conditions of life. All are connected together by intimate dependencies, and are determined by the natural or by the varying states of the vital properties in their operation through material parts."

The physiological world, we are then told, has been lately divided into three schools, viz.: the *Chemical* school, at the head of which stands Liebig, which virtually regards organic nature as a part only of inorganic, endowed with the same properties and governed by the same laws; the *Vitalistic*, of which our author is the special champion, which regards organic and inorganic nature as distinct in their most essential attributes, supposes that each department is governed by properties and laws peculiar to itself, and regards the organic being as fundamentally distinct from the inorganic in its elementary constitution, in the aggregation of its molecules, in the structure of its parts, in its condition as a whole, and in every phenomenon which it evinces; and finally, the *Chemico-vitalistic* school, which takes into consideration the doctrines of both vitalism and chemistry, and discriminatingly assigns some of the phenomena of life to a peculiar vital agent, and others to the action of physical and chemical forces belonging to organic in common with inorganic matter. Our author condemns, and entirely rejects, not only the first, but also the last, of these, which latter makes, he says, a compromise with philosophy, taking, as it does, its rule "*in medio tutissimus ibis.*" This chemico-vitalistic school endeavors to form, as it were, a bond of union between the schools of pure vitalism and of pure chemistry—an alliance hinted to be as unnatural as human brains in a block of granite; yet this is the school to which the young student has the greatest chance of becoming the victim; for it is apparently recommended by its conciliatory principle, and by many of the most distinguished members of our profession.

To the author life is not only a distinct entity—distinct from all other things in nature—but a peculiar governing principle or power, with properties, forces, and laws entirely unknown in the inorganic world. While the laboratory is the proper place for the study of the inorganic kingdom, we must go to the organic being itself to learn the nature of the powers and laws by which it is governed. All the labors of physiologico-chemists are useless, and worse than useless. In their invasions upon the science of life, they aspire at a substitution of their ever fluctuating principles for the profound principles and laws of nature upon which the rich domain of physiology and medicine is securely based, and instead of the latter, to rear up a fabric of medicine upon an imaginary foundation. But their school must fall beneath the weight of its vast errors and corruptions. The world is fast awaking from its spell-bound delusion, and the doctrines of the "reformer" (LIEBIG) will soon be mingled with the same and more

original chimeras which did their part in "the dark ages of science." Our author repeatedly seals his determined opposition "even unto death" with the emphatic language here recorded, and sentences like the following: "*Chemistry has been a perfect incubus upon medicine; and the time is not distant when it will have proved, by its own showing, its want of relation to our subject, if it have not done so already.*"—"No department of medicine has anything to hope from chemistry beyond its power of analysis."—"Chemical and mechanical philosophy, as we have already seen, are strangers to the philosophy of medicine."—"At the very threshold, we are met by a barrier which the chemist and physical philosopher cannot pass from one side, nor the physiologist from the other."

Such is the stand-point, and such the intrepid spirit—conscious of the integrity of his motives, with faith in the truth of his tenets, ever ready to battle with opposition—from which and with which Prof. Paine leads his readers step by step onward through the intricacies of the vast range before him:—the INSTITUTIONES MEDICINÆ. First, the various topics of *Physiology*, viz.: the composition of organic beings; their structure; their properties, (vital principle, irritability, sensibility, mobility, vital affinity, vivification, nervous power, properties of mind and instinct;) their functions, (motion, absorption, assimilation, distribution, appropriation, excretion, calorification, generation, sensation, sympathy, functions relative to the mental principle and instinct;) modifications of functions and properties which arise from sex, age, temperament, climate, race, habits, etc.; the relations of organic beings to external objects; and, finally, death;—are taken up in detail, and discussed with special reference to vitalistic doctrines. No opportunity is lost to refute the deductions and arguments of the chemists; and the "Summary Conclusion" is reached that the vital principle lies at the foundation of all the phenomena, and will explain every phenomenon of organic beings. Next, *Pathology*, reviewing (1) the remote causes of disease, (2) the proximate or pathological causes, and (3) the symptoms, is methodically proceeded with. The symptoms, or effects to be employed as guides to the nature and seats of disease, are divided into—1st, Those which are denominated vital signs, and which are independent of physical products. 2d, The changes of motion and other conditions relating to the vessels which are the instruments of disease, but which are independent of structural changes. 3d, The physical products which are comprehended under the denominations of secretions and excretions. 4th, Symptoms of the foregoing nature which are determined or modi-

fied by changes of organization, and about which morbid anatomy is interested. 5th, Signs of a physical nature which depend upon either some change of structure, or on the accumulation of fluids, or the presence of some unusual fluid, or other substance, within the body. The various conditions of the pulse, the tongue, the urine, the sweat, the mucus, and the alvine discharges, are specially described in detail. Then follow the pathological indications to be derived from morbid anatomy, the bearings of which are greatly limited; and while comparing the Hippocratic and anatomical or necroscopic schools of medicine, the author vindicates the superiority of the mass of American over the mass of European, especially British, practitioners,—a subject to which allusion is again made in the "Notes." To illustrate the most important principles laid down, the next thirty or forty pages are devoted to the consideration of inflammation and fever: "the two orders of disease, indeed, which make up the great amount of human maladies, and form the great outlets of life." "The few diseases which do not fall under one or the other of the foregoing denominations are least important in a practical sense, and least understood in their pathology. Nevertheless, a knowledge of the principles which apply to the pathology of inflammation and fever will greatly aid our interpretation of the essential changes which constitute the pathological conditions of other affections." Many affections described by other authors, as hyperæmia, hypertrophy, lesions of nutrition, irritation in consequence of loss of blood, etc., etc., are included in the domain of inflammation. Inflammation is always a local disease, while fever affects the system universally; nevertheless, inflammation is often complicated with fever at the invasion of the latter, and may be its exciting, though not its predisposing, cause; and fever rarely exists long without giving rise to inflammation, of which it may be either an exciting cause in organs already predisposed, or may be the predisposing as well as the exciting cause. All these subjects, including also venous congestion (constituted, essentially, by inflammation of the venous tissue,) and venous hæmorhage, (regarded as not the result of a rupture, but a purely vital process, analogous to secretion,) etc., etc., are to be explained properly only by vitalism and solidism. This division of the volume ends with an exposition and refutation of Humoralism. *Therapeutics*, the great ultimate object of all medical inquiries, is now fully reached. Simple in principle and complex in details, it is thoroughly discussed, not only in its general aspects, but in exceedingly numerous special applications to particular diseases and states of disease. In the treatment

of disease, we do but substitute one morbid action for another: all remedies of positive virtues are morbific in action, and therefore really operate upon the same principle as the remote causes of disease—the difference being, that the latter impair the recuperative principle more than the former, which substitute pathological conditions less profoundly morbid, and therefore capable of subsiding spontaneously. The cure, therefore, is essentially the work of Nature. As every disease is a succession of pathological changes, it is the object of every successive remedy to introduce a new pathological condition, till that one is attained which is most conducive to a spontaneous subsidence, and hence the importance of applying the right remedies, and in the right doses, and at the right time, and as one remedy prepares the way for another, in a well-regulated consecutive order, and of projecting as far as possible a plan of treatment at its beginning. We endeavor to imitate Nature in her spontaneous efforts at relief, so far as principle is concerned; and since fever and inflammation comprise all the severe forms of disease, and as there is nothing in the results of spontaneous changes which correspond with those induced by tonics and stimulants, we may safely conclude, continues our author, that those practitioners who often resort to that class of agents have but very imperfect views in physiology and pathology, and are astray from the path of Nature. Simplicity of treatment is a ruling principle. No remedial agents are truly specific; predisposing causes often modify a common form of disease in such modes as to require, more or less, the agency of remedies not adapted to the common form; and there is no remedy, however adapted to the cure of any given disease, which will not sometimes fail, and admit of a substitute apparently quite different. Even blood-letting, catharties, &c., will fail in some cases of inflammation. It should be constantly borne in mind that a tonic, an antiphlogistic, &c., are only such when appropriate to the case before us. It is no uncommon prejudice that certain local and even constitutional forms of disease should be allowed to continue for the prevention of some apprehended greater evil. Thus, the intermittent fever is allowed to persist, that some peccant matter may be concocted and expelled; ulcers are cherished as outlets to vicious humors; &c. But, we are never benefited by the continuance of natural diseases. The sooner we get rid of them, the more shall we insure the chances of prolonged life, enjoy an exemption from corporeal and moral suffering, and manifest our common sense.—Catharties, astringents, tonics and diffusible stimulants, narcotics, antispasmodics, cinchona and its alkaloids, arsenic, iodine, ergot,

emmenagogues, diuretics, expectorants and counter-irritants are then specially investigated, together with the general philosophy of remedial action, (illustrated by the seton, local sedatives, warm poultices, genito-urinary agents, uterine agents, etc., etc.) Lastly, but emphatically not least in either the importance attached to it, the space allotted to it, or the ability concentrated upon its discussion by the author, comes Blood-letting, its influences and *modus operandi*, considered with reference to the practical application of the remedy and the various circumstances of disease. The general conclusions arrived at in regard to the design of direct depletion are as follows: "That in blood-letting five principal objects are contemplated: 1. To reduce the volume of blood. 2. To thus establish a change of action in the capillary blood-vessels. 3. To thus obtain the alterative action of the nervous influence. 4. To reduce the exciting nervous influence attendant on inflammation and fever, whether reflex or direct, that disease shall abate, and that cathartics, counter-irritants, &c., when necessary, may operate without exciting a morbific reflex nervous action. 5. To thus, also, prepare the way for other remedies by promoting their salutary effects and preventing their deleterious, which have equally a reference to the condition of the nervous influence."

An exceedingly elaborate double Index greatly facilitates reference to any particular point, and being in itself a well-digested summary of the author's views, renders the work still more valuable.

The Appendix and Supplement reiterate many of the opinions expressed in the previous text of the volume, and add new illustrations.

In conclusion, we republish, in his own words, the more important of the specifications of his claims. He asserts his claim of originality to:

"1. All that is relative, in principle, to *Reflex Action of the Nervous System* in Pathology and Therapeutics, including the application of antecedent experiments to determine the 'Laws of Sympathy' and of the 'Vital Functions,' as they respect the natural conditions, to all the great problems in those branches of Medicine, so far as the Nervous Influence is involved as a modifying cause; and a systematic *generalization* of the whole subject."

"2. The doctrine of *Modification of the Nervous Power* by the Causes which bring it into action, and according to the nature of each Cause, whether mental or physical, remedial or morbific, external and internal, and through which its *Alterative* influences are exerted in conformity with its various modifications, respectively—regarding, therefore, the Nervous Power as a *Vital Alterative Agent*, and susceptible of an endless variety of changes in *kind* from the influence

of exciting causes; being thus rendered, in its extremes of change, either a vital *stimulant* or *sedative*, exerting *alterative* effects, with corresponding results in both the solids and fluids.—The application of this philosophy equally to the cure and production of diseases in all their gradations.

"3. The doctrine and demonstration of the operation of *Remedial Agents* and *Morbific Causes* by *Reflex Action of the Nervous System*, as, also, through the foregoing *modification* of the Nervous Power, and all that is relative to the same action in Pathology and Therapeutics."

"7. Distinction between the agencies of *Reflex Nervous Action* in the *modus operandi* of the Author's group of *Alteratives* and among other denominations of Remedies—an important consideration, by which the *gradual* operation of Remedies through *Reflex Nervous Action* is rendered clearly intelligible."

"8. All embraced in this work, and in the Medical and Physiological Commentaries, upon the *Influences and Modus Operandi of* Loss of Blood, (whether in General Blood-letting or Leeching,) which are interpreted by the Author upon purely Physiological Laws, and mainly through *Reflex Action of the Nervous System*."

"13. The proof and reasoning embraced in these Institutes, and in the Medical and Physiological Commentaries, and other works, in behalf of Vital Solidism, as applied to Physiology, Pathology, and Therapeutics, and in opposition to the Chemical hypotheses."

"17. Analysis and elaboration of the *Properties of Life*, as contained in this work."

"22. Demonstration of the dependence of *Digestion* upon Vital Laws, and to the exclusion of the Chemical, as contained in this work, and in the Medical and Physiological Commentaries."

"27. The distinction between *Inflammation* and *Fever*, and what is most essential in proving an active condition of the immediate instruments of Inflammation, and the dependence of its different stages, and of all its phases and products, upon Vital Laws, as embraced in these Institutes, and in the Medical and Physiological Commentaries."

"37. A *Therapeutical Arrangement of the Materia Medica* upon Physiological principles, and in the order of the relative therapeutical value of the different substances, and as applied to particular forms of disease.

"38. All that is relative to the Substantive Existence and Physiology of the Soul and Instinctive Principle, as embraced in this work, and in the former Essay upon those subjects."

Whether adopting or rejecting the peculiar views of Dr. Paine;

whether admitting or contesting the correctness of either his premises or conclusions, no thoughtful reader can lay down his volume without feeling that he parts company with one of the master-minds of our profession. Dr. Paine recognized the truth of certain doctrines at a time when they were almost universally regarded as false; he became their expounder; in the face of overwhelming opposition, their unvanquished defender; he battled bravely, long and well; he was RIGHT in what he affirmed, but unfortunately, in the heroic struggle, it was not long before he was wrong in what he denied; one of the co-ordinate sources of knowledge had become to him the "*Grand Central Sun*," and all lights emanating from other luminaries, *ignes fatui* arising but from error, superstition, and corruption, and calculated but to mislead. We cannot but admit that there is some ground for the judgment of the reviewer, who would denounce the author's platform as one-sided, partisan, and proscriptive, or who would look upon his doctrines and arguments as to a great extent invalidated by "prejudices against the progress of science" and "obstinate adherence to errors;" but the marvelous assiduity with which his details are collected, and the consummate skill with which they are arranged and used; his great learning, his acute reasoning, his uncompromising consistency; the vast importance of the subjects he so ably discusses, the comprehensiveness of the doctrines he so boldly advances and so earnestly defends, and the noble "*courage de son opinion*" he so candidly shows in the records of his own practice—no one can justly deny, or fail profoundly to respect. Incontrovertibly Dr. Paine has proved himself a *medical philosopher*, and we sincerely recommend a perusal of his work to every thinking, educated man, warning him, however, against falling into the error of "Exclusivism."

The publishers have gotten up the volume in splendid style. ***

We greatly regret that we have not space to notice two valuable text-books recently issued by Lippincott & Co., and authorized by the Surgeon-General for the use of Medical Officers in the Army, entitled respectively—"The Hospital Steward's Manual for the Instruction of Hospital Stewards," etc., by Joseph Janvier Woodward, M.D., and the "Anatomy of the Arteries of the Human Body, Descriptive and Surgical, with the Descriptive Anatomy of the Heart," by John Hatch Power, M.D. The action of General Hammond is enough to guarantee the value of matter, while the press-mark of "J. B. Lippincott & Co." is a sufficient assurance of the beauty of the manner.

The second volume of Prof. Frerich's "Clinical Treatise on the Diseases of the Liver" is also before us, and had we continued to edit the MONTHLY, should have received as extended a notice as its own intrinsic merits and the praiseworthy efforts of the New Sydenham Society to enrich the English language with the wealth of foreign research deserve.

EDITORIAL AND MISCELLANEOUS.

— We cannot refrain from placing upon our pages, although it is not at the first glance a medical document, the following General Order of the President, which will rank on the page of history with the noblest utterances of the Christian patriot and the enlightened ruler:

EXECUTIVE MANSION, *Washington, Nov.* 15, 1862.

The President, Commander-in-Chief of the Army and Navy, desires and enjoins the orderly observance of the Sabbath by the officers and men in the military and naval service. The importance for man and beast of the prescribed weekly rest, the sacred rights of Christian soldiers and sailors, a becoming deference to the best sentiments of a Christian people, and a due regard for the Divine Will, demand that Sunday labor in the army and navy be reduced to the measure of strict necessity. The discipline and character of the National forces should not suffer, nor the cause they defend be imperiled, by the profanation of the day or name of the Most High. "At this time of public distress," adopting the words of Washington in 1776, "men may find enough to do in the service of God and their country, without abandoning themselves to vice and immorality." The first general order issued by the Father of his Country, after the Declaration of Independence, indicates the spirit in which our institutions were founded and should ever be defended: "*The General hopes and trusts that every officer and man will endeavor to live and act as becomes a Christian soldier, defending the dearest rights and liberties of his country.*"

ABRAHAM LINCOLN.

Not alone a high moral sense, not alone a decent regard for the opinions of a great religious community, or respect for the scruples of thousands of Christian soldiers, are apparent as the moving springs of this earnest injunction, but in addition to all these worthy motives, a profound conviction of the absolute necessity to every living being of a periodic rest in order to the maintenance of such a degree of vigor as shall render its labor most available. We are confident that its rigid enforcement will add essentially to the mere physical strength of the army, while its influence as a moral agent in promoting good order, discipline and self-respect among the rank and file, will be of incalculable value.

No better proof of the disastrous effects of unremitting toil, without the relief of the seventh-day respite, need be asked than that

afforded by the two learned professions whose duties necessarily deprive them of it—the clerical and our own. It is difficult to find either the pastor of a large city church, or a physician in a first-class practice, who does not, every few years, generally oftener than once in seven, find himself broken down, and compelled to take the relaxation afforded by a trip to Europe or the West Indies, if he would preserve his life. This is now an every-day occurrence. Scarce a steamer leaves our shores for the Old World but carries out a weary health-seeker belonging to one or other of these callings. Our clerical friends preponderate for two reasons: First, because they are more completely deprived of their day of rest than we; secondly, because the constant exercise, open-air life, and variety of material for thought which the practice of medicine affords, render it, *per se*, the most conducive to health of any vocation of civilized life.

In the case of the clergy, the evil is one which is innate and inseparable from their profession. We can only recognize and lament it. But in our own craft, while it is, of course, to a certain extent, a necessity, yet it is not so, we confidently maintain, to nearly so great a degree as the good-nature, or indifference, or willful perversion of many of our brethren make it.

While it is the duty of the physician to answer any call of emergency which may present itself on that day, as on any other, and to continue to visit any patient whom he has considered it necessary to see daily, it is not his duty to submit to the imposition of those who treasure up their bodily ills through the week that they may "give up and send for the doctor on Sunday." Every physician knows how constantly this is done, and how often he is called to see patients on Sunday who send for him no other day in the week.

Mr. Soul-in-his-Ledger's wife has an affection which will necessitate a serious operation. Next to his ledger, Mr. S. dotes on his wife, and is naturally most anxious to be present himself on the trying occasion. But how can he be away from the counting-house an entire day? It is a perplexing question. He meditates it long and painfully. At last light breaks in—he sees his way out of the difficulty. He will have the operation performed on Sunday. It strikes him as it never struck him before, what a blessing Sunday is! So he announces to the family physician, Dr. Impecunious, his determination. The doctor has made some other arrangement, perhaps, by which he hopes to pass a portion of the day with his family. But Mr. Soul-in-his-Ledger is a rich man, and the doctor cannot afford to lose his patronage: so he accedes to the arrangement with a smiling

face, as though it were just what he most wished, and he and Dr. Hackwell, the surgeon, and the three or four physicians who assist him, have several hours taken out of their day of rest, and devoted to a matter which taxes all their faculties to the utmost. Now there is but one way of demonstrating to Mr. Soul-in-his-Ledger that these professional gentlemen have quite as much right to their day of rest as he to his, and that is by the *argumentum ad sacculum*—an *appeal to his pocket*. If it were a generally understood thing that physicians charged a double fee for a Sunday visit or a Sunday operation, we are confident that they would be allowed to have the day much more to themselves, and we can see no good and sufficient reason why the profession throughout the country is not perfectly competent to adopt such a rule. ☞

—New York County Medical Society—*Alf. Underhill, M.D.*, President, *Guido Furman, M.D.*, Secretary.—The regular meeting of this Society was held on Monday evening, Dec. 1st, 1862, at the College of Physicians and Surgeons. The President remarked that the Society was now in a working condition, and hoped that the different members who intended to present cases or read papers before the Society, would notify him or the Secretary of their intention to do so. It was suggested that they should be handed in early enough to have notice of them given in the medical journals of this city.

The prevalence of diphtheria being part of the report presented by the Committee on Disease, a discussion of it was entered upon by Drs. Bulkley, Stone, Henschel, and others. It will be the leading subject for discussion at the next meeting. Dr. Thomson concluded the reading of his paper. By special permission he is permitted to publish it, and it will be embodied in Dr. Hammond's (Surgeon-General of the U. S. Army) work, now in progress of preparation.

Dr. Henschel read part of a paper on typhus. Considering this disease a blood-poisoning, with occasional localization in different organs of the body, he supported the theory of its cyclical nature. Hence, if it has not proven fatal by its overpowering influence on one of the nobler organs, the system must of necessity return to health. He then gave the different forms and localizations of this disease, with their treatment, depending chiefly on the stimulating method, and confining the adhibition of large doses of calomel to the enteric form with inconsiderable or no diarrhœa.

Dr. Bulkley remarked that the credit of discovering prolonged expiration, referred to by Dr. Thomson in his paper, as a sign of incipient tubercle, is due to one of our own countrymen, namely: to the

son of Dr. John Jackson, of Boston, who pointed it out to Louis of Paris. This distinguished auscultator speaks of it as a valued sign.

— The present number closes the *eighteenth* volume of the MONTHLY, and with it the publication of the journal is for the present *suspended*.

The sole cause of this suspension is the continued absence of the Editor, which prevents him from giving any attention to his editorial duties, or—as he holds the title of the journal—from supervising its business arrangements.

The absence of the Editor already dates from July, 1861, since which time the journal has been conducted by his friends Dr. Louis Elsberg and Dr. Benjamin Lee. Dr. Elsberg kindly offered to superintend the issue of the journal during the latter half of 1861, and the volumes of the current year (1862) are completed under the able editorial supervision of Dr. Lee. During last summer Dr. Lee was suddenly called away, and was absent for three months, doing duty in the field as Surgeon to the 22d Regiment N. Y. M., when the liberal services of Dr. Elsberg were again devoted to the MONTHLY.

Since 1857, when the present Editor took upon himself the toils and pleasures of journalism, he has been associated with Dr. E. H. Parker—the first editor of the journal—and Dr. L. H. Steiner. As Dr. Parker soon after removed from the city, and as Dr. Steiner's residence was in Maryland, neither of his colleagues could give their personal attention to the journal. This fact, and the uncertainty attending any arrangements which could be made for the continued publication of the MONTHLY, under present circumstances, has decided the Editor to adopt the course herewith announced.

To his editorial colleagues, who have so cordially assisted him throughout his editorial career, the Editor desires here to express his thankful acknowledgments.

From the pleasant associations with the various medical journals of the country, and from his periodical interviews with the subscribers of the MONTHLY throughout the Union, he temporarily parts with much regret. With the cessation of hostilities, with retiring war, with returning peace, he hopes to resume his labors, and he confidently trusts that the pleasant relations which for many years have existed between himself, the editorial corps of his profession, and the subscribers to the MONTHLY, may be speedily and happily renewed.

J. H. DOUGLAS.